

This Week in The Iron Age

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AUGUST 1, 1940

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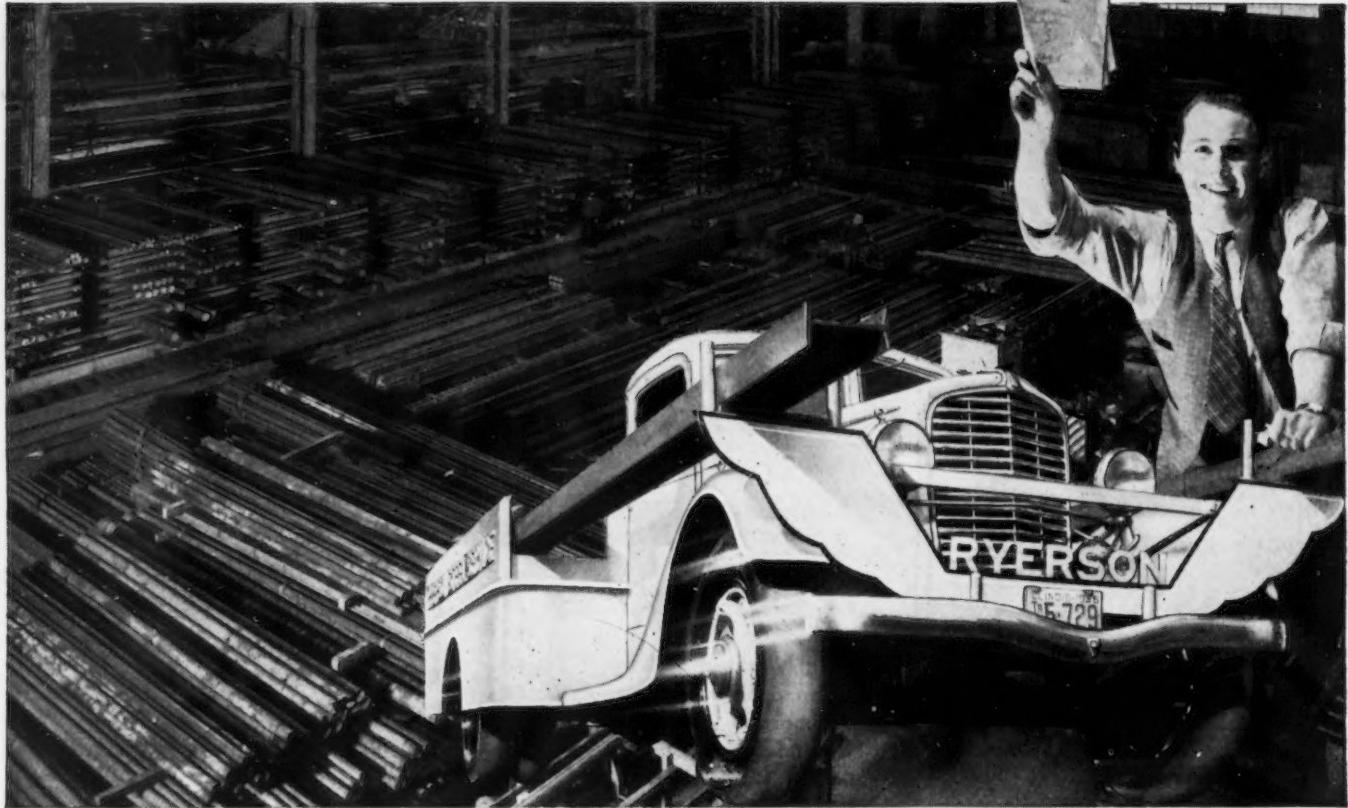
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The Iron Age

AUGUST 1, 1940

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1855

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The Editor Is on Vacation

. . . and so has asked the president to bat for him for a couple of innings.

You might ask "Why not just start the first article one page further front and save yourself trouble?" Well, we did that one summer a year or so ago and lots of people wrote in to ask if the editor had died or been fired, or had become a New Dealer.

Of course, a president cannot be expected to write as well or as much as an editor, and the hardest part of all is to get an idea to start with. Our editor gets most of his ideas from the New Deal and they have been toned down considerably since Willkie was nominated.

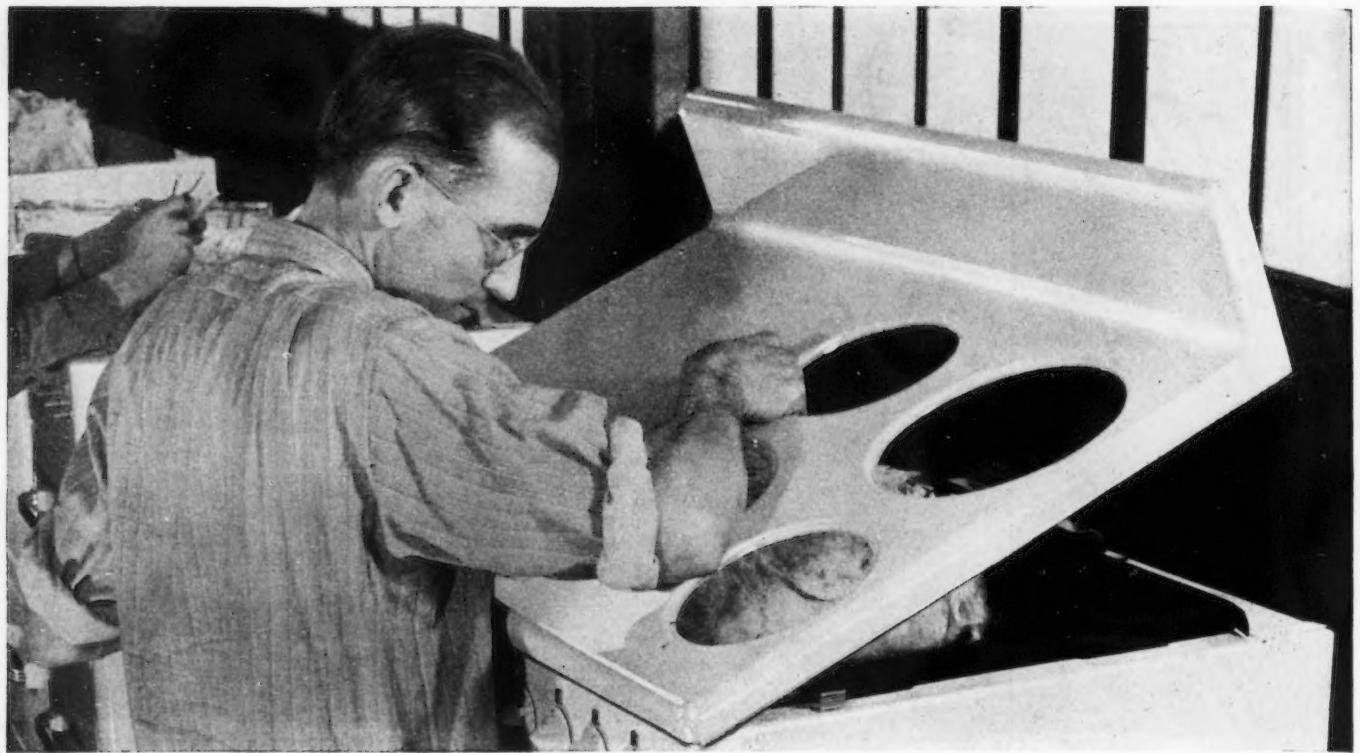
I asked "Van" the other day "What will you do for ideas if Willkie is elected and you cannot pan the New Deal any longer?" But all he said was, "We'll cross that bridge when we get to it."

After all, I don't see why we can't agree with Mr. Roosevelt once in a while. So, while the editor isn't looking, I am going to make a pro-Roosevelt suggestion.

Mr. Roosevelt said that his greatest desire has been to retire from active service after eight strenuous and self-sacrificing years. Let's get together and give him what he wants!

Well, friends, with the help of a dictionary and large type, I have managed to fill this space. I hope "Van" approves of it after he sees it.

President
The Iron Age



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Stress Raisers

—*Their effects on the mechanical properties of metals and alloys. A correlated abstract, of which this is the first of two parts.*

By GEORGE SACHS

Case School of Applied Science,
Cleveland

THE physical or mechanical properties of metals and alloys are usually determined by means of specific laboratory tests, as for instance, the hardness, tensile, impact and fatigue tests. Minimum values derived this way are specified for various applications, and average or typical values for most alloys can be found in the numerous commercial publications.

In service, however, conditions are frequently encountered where these minimum and typical values are not a sufficiently accurate basis for the design of a structure or a machine. Frequently the part yields or breaks under a strain which does not surpass a fraction of the typical value, while occasionally the strength of the structure is found to be considerably higher than calculated.

Stress Raisers

One of the most serious and as yet not completely explained sources of such irregularities is the presence of "stress raisers." Stress raiser as a general term is used to characterize any condition which causes considerable local increases of the magnitude of the stress. The most common stress raiser is an irregularity in the section, or "notch,"¹ such as a surface dent, a groove, a hole, a thread, a keyway and a section change. (See Fig. 1.)

Inherent, external and internal notches (see Fig. 2) are caused by slag inclusions, blowholes, folds, shrinkage cracks such as flakes and

shatter cracks in steels and graphite flakes in cast iron. The action of corrosion, particularly if acting simultaneously with stresses, consists in the development of surface notches of different types, including intercrystalline or intergranular cracks, which are probably the most effective type of notches, (See Fig. 3). A somewhat different, particular type of stress raiser is a pressure perpendicular to the surface, and often associated with sliding movements and wear, called "chafing" or "fretting," such as occur in press fits, bearings and axle seats (See Fig. 4).

The effects of a notch on a strained metal are at present considered to be mainly determined by three components:²

- (1) The magnitude of the stress raising action or "stress peak" as determined by the theory of elasticity.
- (2) The development of lateral stress or a three-axial stress state, and
- (3) The capacity of the metal to gradually reduce and homogenize the stress.

The stress peak mainly depends upon the radius in the bottom of the notch, or fillet. With a relatively small

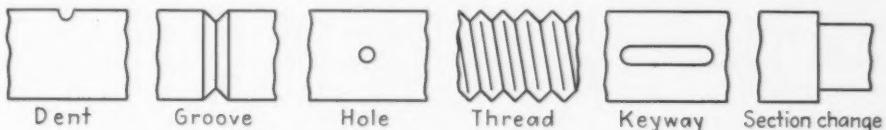


FIG. 1—Various types of notches.

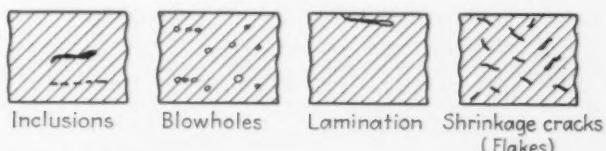


FIG. 2—Various types of inherent notches.



FIG. 3—Various types of corrosion.

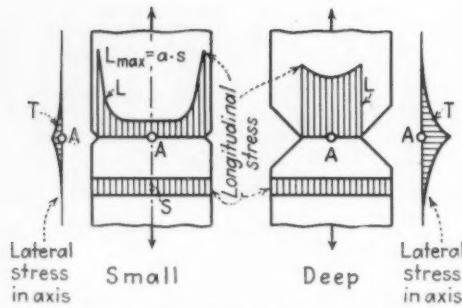
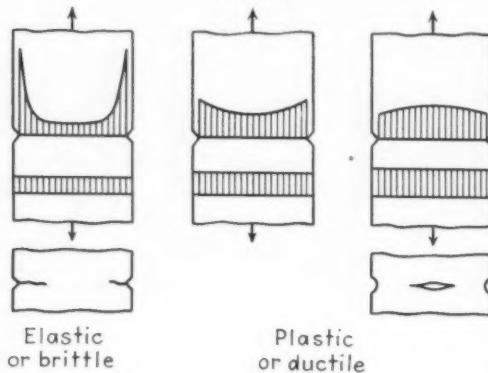


FIG. 4—The effect of notches on the distribution of the longitudinal stresses L in the notched section and the lateral stresses T along the axis of a test bar subjected to tension.



groove around a cylindrical bar the notch factor is:

$$a = 1 + 2 \sqrt{\frac{r}{d}}$$

where r is the radius of the fillet, and d is the diameter of the bar. Thus, a tension stress s applied to a cylindrical bar actually creates a longitudinal tension $L_{max.} = a \cdot s$ at the bottom of the notch or fillet. (See Fig. 4.)

If the notch increases in proportion to the dimension of the bar, the stress peak decreases. The stress becomes again fairly uniform for a very deep notch.

With an increasing depth of the notch, however, gradually stresses

FIG. 6—The effect of stretching on the residual stresses in brass rods.

• • •

FIG. 5—The distribution of the longitudinal stresses and the type of break in the elastic and brittle and in the completely plastic or very ductile condition.

which are perpendicular to the applied stress are developed in the interior (See Fig. 4). Thus, a three-axial stress condition is created. The magnitude of these lateral stresses is not known as yet. It appears, however, that very sharp and deep notches develop a lateral stress as high as about two-thirds of the applied stress, as will be discussed later.

If a metal flows plastically before it breaks, the stress state becomes different from the elastic condition. The stress peak developed in the fillet is gradually reduced, probably to an insignificant value if the metal is sufficiently plastic. (See Fig. 5.) The

extent of this effect may be estimated from the similar action of stretching on the residual stress³ developed in the drawing (through a die) of brass rod (Fig. 6). A reduction of the peak stress of about 50 per cent has been found to be caused by 0.3 per cent stretching, and a reduction of about 10 per cent by a 1 per cent stretching. The reduction of the lateral stresses by plastic deformation progresses more slowly. According to theoretical considerations, an extensive plastic flow should totally change the stress distribution, developing a stress peak in the axis (See Fig. 5). Therefore, brittle metal tends to break under tension at the surface, due to the effect of intentional or unintentional notches, while in very ductile metals—notched or unnotched—the fracture under tension generally begins in the center.

Thus, the effect of a specific stress raiser will depend considerably upon the specific metal, and may be adverse for different metals. This relation will also be affected by the type of the stress raiser.

The effects of the stress raisers are, furthermore, fundamentally different for various types of stress-strain relations. Stress raisers, and particularly mechanical notches, have been investigated extensively for the following three types of strain actions or mechanical tests:

(1) Static tension (and bending).

(2) Notched bar impact bending (and tension).

(3) Fatigue (endurance), mainly of the reversed bending type.

Notches and Static Tension

If cylindrical specimens of a ductile metal, such as of a soft steel, are provided with notches of increasing "sharpness," that is either increasing the depth or reducing the angle or radius of the notch (See Fig. 7), and subjected to a tension test, the mechanical values are gradually changed. These changes appear only partially

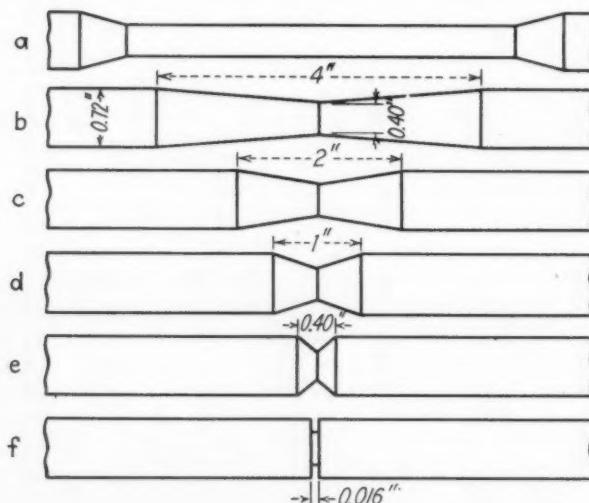
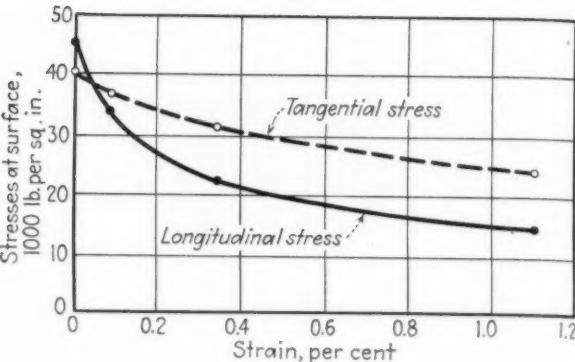


FIG. 7—Shapes of notched tensile test bars used by Ludwik.



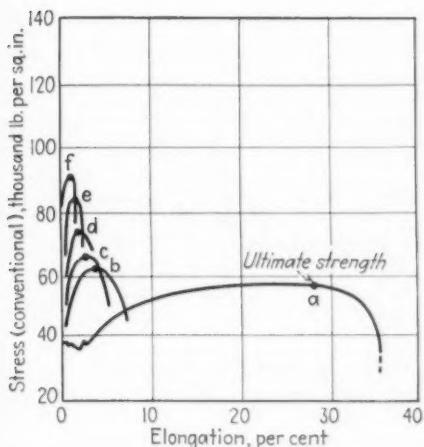


FIG. 8—Stress-strain diagrams for the notched bars in Fig. 7.

in the conventional stress-strain diagrams (See Fig. 8) but are shown clearly if the actual stresses acting on the flowing section are plotted over the lateral reduction or reduction in area of this section (See Fig. 9), or if a value is derived from this reduction and called "effective strain":

(1) The yield strength (or yield point), and to a similar extent the conventional tensile strength (marked I in Fig. 8) in the notched section, and the actual tensile strength (marked II in Figs. 9 and 10) increase,

(2) The "cohesive" strength, taken as the actual stress value (III) at the moment of breaking or "breaking stress" remains approximately constant (See Fig. 10).

(3) The reduction in area at the break or "contraction of area" characterizing the ductility of the metal, decreases.

Attempts, supported by extensive experimental investigations, have been made to correlate the results obtained on notched bar tensile tests with the conception that a brittle break should occur with any metal if subjected to a three-axial tension.⁵ If tension stresses of the same magnitude are acting in three directions, plastic flow cannot occur and the most ductile metal will break in a brittle manner. It has been attempted to show that in the extreme academic case, where 100 per cent of the area is removed by notching, and the notch angle (and fillet radius) become equal to zero, such a three-axial tension state is developed. The ultimate strength obtained from experiments and extrapolated to the extreme condition or "maximum notch strength," should then characterize the actual "cohesive strength" if the metal were forced to break in a brittle manner.

The experiments with ductile metals usually yield a value for the maximum notch strength of two to three times the ultimate strength of the metal.⁵ From this result, conclusions can be drawn regarding the average lateral tension set up by very sharp notches. The determining stress value for the flow of a metal is the maximum shear stress, or the difference between the maximum (longitudinal) and the minimum (lateral) stress.⁶ This flow stress is assumed to remain constant under varying stress conditions. If the usual tensile strength is considered as a measure for this "flow stress," a strength of twice the regular ultimate strength can be obtained under conditions which set up a lateral stress equal to the regular tensile strength. Or, the lateral stress in such a case would amount to 50 per cent of the longitudinal stress. Correspondingly, if the maximum notch strength is equal to three times the tensile strength, an average lateral stress of 67 per cent of the longitudinal stress should be present.

Another method for determining the approximate magnitude of the lateral (elastic) stress in the notched section of a bar can be based on measurements of the lateral elastic strain in the fillet. While a cylindrical bar contracts, the notched section of a deeply notched bar expands in any direction perpendicular to that of tension.⁷ For steel, the longitudinal expansion per unit stress is under regular tension:

$$\frac{1}{E} = \frac{1}{30,000,000} \frac{1}{\text{PSI}},$$

while under hydrostatic tension or

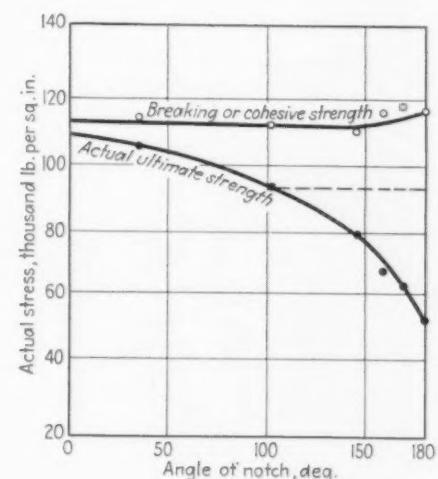


FIG. 10—Effect of notch angle on actual ultimate strength and on cohesive strength.

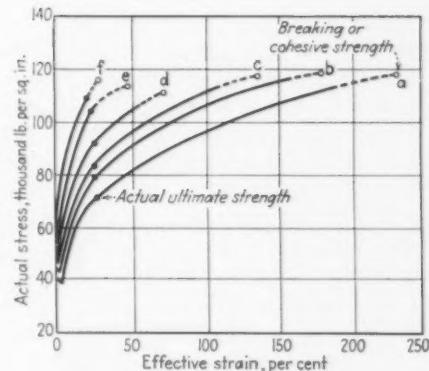


FIG. 9—Actual stress-effective strain diagrams for the notched bars in Fig. 7.

equal tension in three dimensions the following expansion is expected:

$$\frac{1 - 2m}{E} = \frac{1 - 2 \times 0.264}{30,000,000} \frac{1}{\text{PSI}} \\ = \frac{1}{63,000,000} \frac{1}{\text{PSI}},$$

where $E = 30,000,000$; PSI = elastic modulus; and $m = 0.264$, Poisson's ratio. The lateral expansion is:

$$\frac{m}{E} = \frac{1}{113,000,000} \frac{1}{\text{PSI}},$$

and

$$\frac{1 - 2m}{E} = \frac{1}{63,000,000} \frac{1}{\text{PSI}}$$

in the two cases, respectively. It has been found, however, that with a sharp and very deep notch the lateral expansion per unit stress does not exceed

$$\frac{1}{180,000,000} \frac{1}{\text{PSI}},$$

being about the average of the two limiting values. From these figures an average lateral stress corresponding to approximately 55 per cent of the longitudinal tension can be calculated as actually present in deeply notched bars, according to the laws of elasticity.

A (partial) three-axiality of this extent is apparently not sufficient to produce a brittle break in a usually ductile metal. This has been confirmed by experiments with 0.25 per cent carbon steel, both in a fine grained and in a coarse grained condition.⁸ The ultimate strength as well in normal tension as in deeply notched bar tensile tests was found to be practically identical. However, by testing notched bars at the temperature of liquid air definitely brittle breaks have been obtained, and under such circumstances the coarse grained steel has a considerably lower cohesive strength (and probably also ductility) than the steel in a fine grained condition. It has to be concluded therefore that the maximum notch strength in the case of ductile metals does not indicate a brittle

break but that it is of the nature of a ductile fracture. It has been also observed that the particularly high values of the maximum notch strength found in pre-stressed specimens are correlated to a directionality of the properties.¹ Stretched bars have generally a higher yield strength and ultimate strength in tension than in compression and vice versa. This phenomenon is known as "bauschinger effect."

However, some metals that are characterized by a general low ductility may exhibit a lower tensile strength in notched bars than in cylindrical ones, while others show little difference between the strength values of cylindrical and notched bars. Such conditions have been observed in some high carbon steels, cast steel, cast iron, cast brass and particularly in magnesium alloys.² In these cases also, the minimum strength is found with comparatively small notches, while test specimens with deep notches have usually a higher strength. This can be explained by the previously discussed fact that the stress peak has its high-

est value at the fillet of a small notch, while with a deeper notch a more uniform stress distribution is developed (See Fig. 4).

Notched bar tension tests have attracted considerable attention; special types of notched tension specimens have been suggested, such as a specimen with short threaded shoulders,³ or a notched fatigue specimen in which an encircling crack has been developed by rotating under load in a fatigue machine.⁴ For the determination of the notch sensitivity of light sections, welds, etc., a notch-disk test has been proposed in which a disk 2 in. in diameter is provided with a keyhole notch $\frac{1}{8}$ in. in diameter in the center.⁵ The disk can be subjected to bending by means of two levers inserted in a deep recess of the disk.

However, the physical meaning of the results obtained by notched bar tension tests has not been adequately explained as yet.

Ed. Note: Next week the author concludes this correlated abstract by dealing with the effect of notches on

impact bending, the impact characteristics of various steels, etc.

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Thermit Weld Saves Press Cylinder

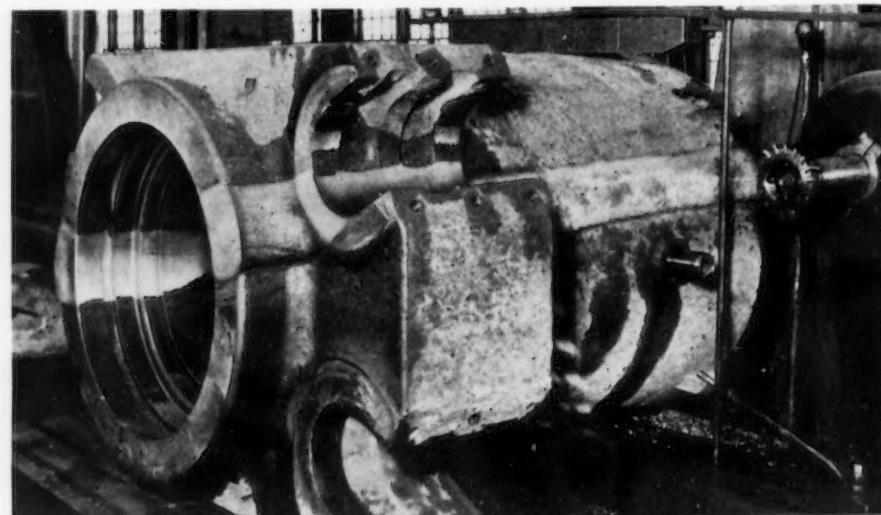
PROLONGED shut-down of an important piece of production equipment was avoided in a rubber factory this past winter by the application of thermit welding. The broken member was a large cast steel cylinder of a hydraulic press used in extruding lead casings on rubber hose and telephone cables. Fracture was complete, the cylinder breaking into two sections, one slightly larger than the other. A 7-ton ram stuck in the larger half and had to be released by heating the wall of the cylinder. The complete cylinder weighs 25 tons, is $7\frac{1}{2}$ in. high, has an inside diameter of 30 in. and a wall thickness varying from 11 to 20 in. Thickness through the closed end section is 14 in.

About one week was required to make the thermit weld, including lining up the broken parts, preparing the edges of the break, building the mold, preheating, pouring the weld metal and allowing the pieces to cool slowly. To make the repair, 5000 lb. of thermit was used and about 70 barrels of molding sand. The final step, which required more time than the welding, involved machining away the collar

of weld metal from inside the cylinder and from those portions of the outside that would otherwise interfere with the tie rods, which hold the cylinder in place in the press.

When the cylinder was returned to

service, it was first tested at 2000 lb. per sq. in. As no leaks were found at this pressure, the full working load of 6000 lb. was applied. It has been operating 24 hr. a day at this pressure for the past six months.



WHEN this hydraulic extrusion press steel cylinder, weighing 25 tons, broke almost in half longitudinally, it was repaired in a relatively short time by the thermit process. This view shows the cylinder machined and ready for return to service.

Aluminum

Rolling and Forging Alloy Practice in Europe

INTENSIVE aircraft production in Europe has naturally stimulated the development of aluminum alloys and this development has been largely in the direction of metals for rolling, extrusion, drawing, stamping and forging. These operations now take the place of the castings previously used, in many cases with a gain in lightness, tensile and fatigue strength, and general reliability.

Needless to say the requirements of the art in respect to composition, temperature of working and treatment and testing methods are much more critical than in the case of cast components—consequently a new technique has grown up to meet these conditions. Unfortunately there has been little or no international standardization and the nomenclature of light alloys is more confusing than ever. A list of 63 alloys is appended to this article, and it can safely be said that by combining trade names, eliminating small and unimportant differences in analysis and rejecting inferior and obsolete metals the total could be reduced to about 15. Since, however, all these designations are still in common use in specifications and literature they have been listed for reference.

DURALUMIN: Regarded not as a single alloy but as a group, duralumin still dominates the field of heat treated light metals of maximum strength. No other alloy gives a superior combination of tensile strength, ductility and fatigue resistance. More or less copper or silicon is employed as dictated by the final properties required, but in the main duralumin does not differ from that originally developed by Wilm in 1909 and promoted by the Durener Metallwerke in Germany.

In a metallurgical sense duralumin has four constituents:

- (1) Aluminum
- (2) Copper-aluminide
- (3) Magnesium-silicide
- (4) Manganese

By ERNEST V. PANNELL

*British Aluminum Co., Ltd.
Bristol, England*

• • •

Of these (2) and (3) are dissolved by heat treatment and subsequently precipitated in a dispersed form by aging or tempering, thus giving the characteristic high strength and ductility which are absent from the alloy in its normal condition. The research of Jeffries and Archer and others resulted in breaking down this alloy into two others each having characteristics of its own. The first containing magnesium but no copper is best known in England as 51S and in Europe as Aludur or Anticorodal. The other containing copper without magnesium is termed 25S in America and its nearest European equivalent is Lautal. The following diagram illustrates the family of alloys all of which derive from the parent Duralumin:

ALLOY	CONSTITUENTS			
Duralumin	Aluminum	Mg ₂ Si	Cu-Al ₂	Mn
Aludur	Aluminum	Mg ₂ Si		
Anticorodal	Aluminum	Mg ₂ Si		Mn
L. M.	Aluminum		Cu-Al ₂	Mn
Lautal	Aluminum		Cu-Al ₂	
Aluman	Aluminum			Mn
"Y" alloy	Aluminum	Al-Cu-Ni	Ni-Al ₂	Mg ₂ Si
RR 56 and 59	Aluminum	Al-Cu-Ni	Ni-Al ₂	Mg ₂ Si Ti

The L.M. composition has only a limited use in Europe. Aluman, on the

other hand, is very widely used as a sheet alloy of moderate strength with good corrosion resistance and good working properties. It has long been in use in England under the name 3S.

HIDUMINUM: Going back to the year 1920 the so-called "Y" alloy developed by the British National Physical Laboratory is conspicuous. It was first announced for piston castings in the form of an aluminum-copper alloy to which was added a percentage of nickel to increase the hot strength of the metal, and a percentage of magnesium to realize some of the good properties of Duralumin.

Subsequent development of this alloy for rolling and forging showed it to be adaptable for these purposes and also amenable to heat treatment. The British have always shown a preference for nickel as an alloy constituent and with good results. Later research by Hall and Bradbury of the Rolls Royce laboratories resulted in the first of the Hiduminium group of alloys in which the composition and treatment of "Y" alloy were modified. These "RR" alloys are in most respects an improvement on "Y", having lower percentage additions and including the valuable deoxidizing and grain refining effect of titanium.

While often compared with Duralumin, the constitution of these alloys is quite different, and although the Mg₂Si component is present it has been shown by Archibald that there is no CuAl₂, its place being taken by an aluminum-copper-nickel compound.

"Y" alloy	Aluminum	Al-Cu-Ni	Ni-Al ₂	Mg ₂ Si
RR 56 and 59	Aluminum	Al-Cu-Ni	Ni-Al ₂	Mg ₂ Si Ti

Alloys containing nickel appear to have especially good properties when

worked or operated hot. For this reason the RR alloys have found an extensive field of use as forgings and hot stampings and play an important part in aircraft production in the form of such parts as pistons, connecting rods, impeller wheels and the like. Tubes, sheets and castings are also produced from alloys in the same group, which makes it possible for an engineering assembly to be built up of light alloys all of a homogeneous type.

In respect to aircraft work in general it may be said that while Duralumin in its various forms plays its greatest part in the structural parts of the plane, Hiduminium alloys—in the form of cylinder heads, pistons, crankcases and connecting rod forgings—compose the greater part of the engines.

DURALINOX: This term covers (in France) the worked alloys of aluminum containing from 3 to 12 per cent magnesium with a small addition of manganese. Such alloys in Britain are covered by "Birmabright" and "MG 7" and in Germany by "Hydronalium" and "Peraluman." They have been introduced following the better understanding and more extensive production of magnesium, and as compared with the older Duralumin class they present a more simple composition, much better corrosion resistance, and in the smaller percentages heat treatment is eliminated. This latter is a valuable property since it increases the possibility of hot working and welding without impairing the temper of the metal.

While still partly in a developmental stage these alloys are coming into more extended use. Birmabright, especially with its 3 to 4 per cent magnesium content, is already established as perhaps the best wrought alloy for resisting marine and chemical corrosion in the form of sheet tube or extrusions. The 7 per cent alloy compares with the equivalent Duralumin in having equal tensile strength, higher yield point but lower elongation and fatigue resistance. The 12 per cent Duralinox when fully heat treated has higher properties throughout but is somewhat more critical in respect to working. The well known Seewasser alloy, introduced by Karl Schmidt in Germany, is of the Birmabright type with a small addition of antimony; it is said that this element forms a film of antimony-oxychloride which still further inhibits corrosion. In France an addition of beryllium is used with these alloys

IN the June 13 issue the author described aluminum casting alloys used in Britain and on the Continent, the types of additive elements and the uses to which such alloys are put. Herein, attention is directed to European practice as regards rolling and forging alloys. The light alloy field is treated in detail as regards metallurgy and applications, and appended is a full list of known European alloys, along with their individual analyses, characteristics and uses.

with a view to preventing oxidation in the melting process.

Birmabright	Aluminum	Magnesium	Mg ₂ Si	Mn
Duralinox	Aluminum	Magnesium	Mg ₂ Si	Mn Be
Seewasser	Aluminum	Magnesium	Mg ₂ Si	Mn Sb

In this diagram it should be noted the presence of magnesium-silicide is not significant except where the alloy is heat treated, as the amount of this compound in solution is very small. For the most part the magnesium forms a solid solution with aluminum and this together with the absence of copper gives the best conditions for resisting corrosion.

ALPAX: Alloys containing the usual 12 per cent silicon are standard in Britain in the form of sheets and tubes for marine construction; they are malleable, ductile and of good corrosion resisting properties. This alloy forms a light substitute for pure aluminum sheet, being some 50 per cent stronger, but is not otherwise outstanding and is not strong enough for aircraft work in stressed components. A useful forging alloy has been derived from this with the addition of copper, nickel and magnesium and will be seen to resemble the cast piston alloy Loex. The forged pistons will have the same useful properties in service with respect to low expansion, although their strength is inferior to RR 59. The forgings are heated, quenched and aged in the usual way to get the full benefit of the nickel and magnesium constituents, and after machining it is usual to normalize at 392 deg. F. In view of the good forging and hot stamping properties of

silicon alloys it is probable that a much wider field will be opened up for this metal.

Alpax (sheets) Aluminum Silicon

Alpax (forged) Aluminum Silicon Al-Cu-Ni Mg₂Si

CONSTRUCTAL: For many years aluminum-zinc alloys have been popular in Europe and in 1918 some remarkable results were achieved by Dr. Rosenhain in extruding, rolling and heat treating a mixture containing 20 per cent zinc with 3 per cent copper; the rest being aluminum with a small addition of magnesium. The physical properties were in advance of duralumin but the high density and low corrosion resistance probably led to the abandonment of this alloy, which was termed 3-20. Later Dr. Czochralski and the Metallbank developed Skleron, an alloy for working and forging, which contained 13 per cent zinc with lithium, the latter taking the place of the usual magnesium for heat treatment effect. Constructal was produced by Theodore Goldschmidt in Essen and incorporated 6 per cent zinc with magnesium but no copper; it rapidly came into use in Germany in the form of extruded and rolled sections of all sizes; it has, however, almost as rapidly gone out of use and is no longer a standard in that country.

More recently, however, the promoters of Hiduminium alloys have introduced a metal of this class termed RR 77, in which, by accurate metallurgical judgment, the constituents have been carefully proportioned to include copper, nickel and titanium. RR 77 is perhaps the strongest extruded and heat treated alloy on the market and is a British standard for aircraft work. It is believed that this alloy is free from the corrosion and cracking troubles previously associated with zinc and which led to their abandonment. The constitution of RR 77 has not yet been sufficiently defined to sketch here, but it is probable that the compound Mg-Zn₂ as well as Mg₂Si and the complex Cu-Ni constituents play their part in improving the properties under heat treatment.

In addition to the five groups of alloys just surveyed, a number are in more or less limited use which fall into no scheme of classification. These will be found in the appended list with their usual compositions.

The following figures for physical properties are intended to be representative only and subject to correction with respect to the specific form and treatment of the metal. Alloys are

classified in the five main groups already surveyed, although it is understood all of them have additional trade names in common use. The yield point is that termed "proof stress" in British practice and corresponds to the stress which produces a permanent elongation of 0.1 per cent.

Alloy Group	Duralumin	Hiduminium	Duralinox	Alpax	Constructal
Designation	4 L 1	RR 56	MG 7	S-12	RR 77
Tensile, lb. per sq. in.	56,000	60,000	56,000	45,000	73,000
Yield	34,000	47,000	34,000	..	60,000
Elongation, per cent	15	10	15	3	8
Brinell hardness	100	120	107	..	..
Fatigue, Ig. per sq. in.	21,000	23,000	22,000	..	..

European Light Alloys for Rolling and Forging

(The compositions shown are average values. The symbol T indicates that the metal is heat treated.)

AERON (T)

Aluminum	96.4
Copper	1.8
Manganese	0.8
Silicon	1.0

Developed by the Metallbank in Germany and covering a wide range of analyses, some containing lithium.

AEROMIN

Aluminum	92.7
Magnesium	6.2
Iron	0.8
Silicon	0.3

German alloy developed prior to and superseded by Hydronalium.

ALDAL (T)

Aluminum	95.8
Copper	3.4
Magnesium	0.4
Manganese	0.4

Duralumin; French designation.

ALDREY (T)

Aluminum	99.0
Magnesium	0.4
Silicon	0.6

Developed by Siemens Schuckertwerke, Berlin, for electric conductor wires.

ALFERIUM (T)

Aluminum	92.9
Copper	5.7
Magnesium	0.7
Manganese	0.7

Duralumin with high copper, as developed in France by Schneider et Cie.

ALMAG (T)

Aluminum	96.2
Copper	2.5
Magnesium	0.7
Manganese	0.6

Duralumin; French designation.

ALMASILIUM (T)

Aluminum	97.0
Magnesium	1.0
Silicon	2.0

Developed by the Aluminium, Francaise, Paris, for resistance to corrosion and ease of working.

ALMELEC (T)

Aluminum	98.5
Magnesium	0.7
Silicon	0.5
Iron	0.3

Developed as above, but composition and treatment designed for maximum electrical conductivity.

ALPAX

Aluminum	87.0
Silicon	13.0

Standard in Britain in sheet form for marine construction.

ALUDUR (T)

Aluminum	98.0
Magnesium	0.6
Silicon	0.9
Manganese	0.5

Developed originally by Geb. Giulini in Ludwigshafen. Several alternative analyses are found.

ALUMAG

Aluminum	95.5
Magnesium	4.5

Developed in France but now superseded by Duralinox.

AVIONAL D (T)

Aluminum	94.2
Copper	4.3
Magnesium	0.6
Manganese	0.5
Silicon	0.4

Duralumin as developed in Switzerland by the Aluminum Industrie A.G.

ALUMAN

Aluminum	98.5
Manganese	1.5

Used in many parts of Europe as a corrosion resisting sheet alloy. Similar to the American 3S.

ANTICORODAL (T)

Aluminum	97.6
Magnesium	0.7
Manganese	0.7
Silicon	1.0

Sheet and tube alloy developed by the Aluminium Industrie A.G., Switzerland, for corrosion resistance.

AVIAL

?
?
?

Trade designation for light alloys developed by Bidault et Cie., Paris.

AVIOL (T)

Aluminum	98.7
Magnesium	0.6
Silicon	0.7

Similar to Aludur; stated to have been developed in Russia.

BERGAL (T)

Aluminum	94.1
Copper	4.0
Magnesium	0.8
Manganese	0.7
Silicon	0.4

Duralumin as produced by the Bergmann Elektrizitätswerke, Berlin.

BIRMA BRIGHT

Aluminum	95.0
Magnesium	4.5
Manganese	0.5

Developed by the Birmingham Aluminum Castings Co., England, for high strength and corrosion resistance.

BONDUR

Aluminum	94.6
Copper	4.0
Magnesium	0.4
Manganese	0.6
Silicon	0.4

Duralumin as developed by the Vereinigte Leichtmetallwerke, Bonn, Germany.

CERALUMIN F (T)

Aluminum	93.5
Copper	2.3
Nickel	1.2
Silicon	0.9
Magnesium	0.9
Iron	1.0
Cerium	0.17

British standard alloy for extruded rods and sections, developed by J. Stone & Co., Deptford, England. One of a group containing cerium.

CONSTRUCTAL 2 (T)

Aluminum	97.0
Copper	1.0
Magnesium	0.5
Manganese	0.5
Silicon	0.5

Developed by Theodore Goldschmidt in Germany as a low copper Duralumin type alloy for ease of working and corrosion resistance.

CONSTRUCTAL 8 (T)

Aluminum	91.0
Zinc	6.0
Magnesium	1.4
Manganese	1.3

Developed by the above to give higher strength than Constructal 2 but with a more limited working range.

CORROFESTAL (T)

Aluminum	98.0
Magnesium	0.9
Manganese	0.6
Silicon	0.5

Produced by the Deutsche Messingwerke, Berlin; similar to Anticorodal.

DONAL

Aluminum	98.5
Manganese	1.5

Produced by the Wielandwerke, Ulm, Germany, and identical with Aluman.

DURALINOX 5

Aluminum	94.5
Magnesium	5.0
Manganese	0.5

One of a group containing 3 to 7 per cent magnesium, developed by the Societe du Duralumin, Paris, for high strength and corrosion-resistance without heat treatment.

DURALINOX P

Aluminum	87.5
Magnesium	12.0
Manganese	0.5

Similar to the above but with higher strength and lower ductility.

DURALIT (T)

Aluminum	93.6
Copper	3.0
Nickel	0.5
Magnesium	0.5
Iron	1.5
Silicon	0.7
Titanium	0.1

French alloy used for forging connecting rods.

DURCILUM (T)

Aluminum	94.3
Copper	4.0
Magnesium	0.5
Manganese	0.5
Silicon	0.7

Duralumin as produced by the Trefileries et Laminoirs de Havre, France.

FORTAL (T)

Aluminum	94.3
Copper	4.0
Magnesium	0.5
Manganese	0.5
Silicon	0.7

Duralumin as produced by the Cie. Francaise des Metaux, Paris.

DURALUMIN (T)

Aluminum	94.3
Copper	4.0
Magnesium	0.5
Manganese	0.5
Silicon	0.7

Normal composition of the alloy as originally developed by the Durener Metallwerke, Germany. Variants exist in respect of copper and silicon contents.

HEDDUR (T)

Aluminum	94.1
Copper	4.25
Magnesium	0.55
Manganese	0.6
Silicon	0.5

Duralumin as produced by the Heddernheimer Kupferwerke, Germany.

HIDUMINIUM (S 12) (T)

(See also RR alloys)	
Aluminum	94.8
Silicon	12.0
Copper	1.0
Nickel	1.0
Magnesium	1.2

British standard forging alloy for aircraft pistons, etc. (Closely related to the cast alloy "Loex.")

HYDRONALIUM 7

Aluminum	92.5
Magnesium	7.0
Manganese	0.5

German equivalent of Duralinox.

IGEDUR (T)**Usual**

Duralumin as produced by the I. G. Farbenindustrie, Germany.

LAUTAL (T)

Aluminum	94.6
Copper	5.0
Silicon	0.4

Developed by the Vereinigte Leichtmetallwerke, Bonn. Originally contained 2 per cent Si. A general purpose alloy.

L. M. (T)

Aluminum	93.75
Copper	4.75
Manganese	0.75
Silicon	0.75

Used to a limited extent in Italy; closely related to the American 25 S.

LEGAL (T)

Aluminum	97.2
Magnesium	1.0
Manganese	0.8
Silicon	1.0

Developed by Siemens Schuckertwerke, Berlin, for sheets and tubes; similar to Anticorodal.

MANGAL

Aluminum	98.5
Manganese	1.5

Similar to Aluman. Developed by the Vereinigte Leichtmetallwerke, Bonn.

MG 7

Aluminum	92.5
Magnesium	7.0
Manganese	0.5

British standard alloy produced by Jas. Booth & Co. Equivalent to Duralinox.

MONTEGAL (T)

Aluminum	98.0
Magnesium	1.0
Silicon	0.8
Calcium	0.2

Developed by Theodore Goldschmidt in Germany for electrical conductor wires; calcium introduced for increased conductivity.

NICRAL (T)

Aluminum	97.9
Copper	0.6
Magnesium	0.4
Nickel	0.7
Chromium	0.4

Duralumin type with additional hardness conferred by chromium. In very limited use in Europe.

NURAL (T)

Aluminum	92.0
Magnesium	7.0
Manganese	0.4
Silicon	0.6

German equivalent of Duralinox.

OSMAGAL

Aluminum	98.2
Manganese	1.8

Similar to Aluman; produced by Oshabrunner Kupfer und Drahtwerke, Germany.

PANTAL (T)

Aluminum	93.7
Silicon	5.0
Magnesium	0.6
Manganese	0.6
Titanium	0.1

One of a group of silicon alloys produced by the Vereinigte Leichtmetallwerke, Germany.

POLIVIT

Aluminum	97.4
Copper	0.6
Manganese	1.8
Silver	0.2

In very limited use in Germany for products with a high polish.

PERALUMAN 7

Aluminum	92.5
Manganese	7.0

Duralinox as produced in Switzerland by the Aluminium Industrie, A. G., Neuhausen.

R.R. 56 (T)

Aluminum	93.7
Copper	2.0
Magnesium	0.8
Iron	1.4
Silicon	0.7

The R.R. group of alloys were mainly developed by Hall and Bradbury of Rolls Royce, Derby, England, and the principal ones are characterized by the presence of nickel and titanium. R.R. 56 used for tubes and sheets.

R.R. 59 (T)

Aluminum	92.7
Copper	2.3
Magnesium	1.6
Iron	1.4
Silicon	0.5

British standard for forgings.

R.R. 66

Aluminum	94.5
Magnesium	5.0
Manganese	0.5

British standard, equivalent to M.G. 7 and Duralinox.

R.R. 72 (T)

Aluminum	94.0
Copper	4.0
Magnesium	1.2
Manganese	0.8
British standard alloy, a high magnesium Duralumin.	

taking the place of magnesium. Only in limited use.

STUDAL

Aluminum	97.7
Magnesium	1.0
Manganese	1.3

Promoted in France by the Studio des Alliages Legères as a general purpose sheet and tube alloy.

R.R. 75 (T)

Aluminum	97.6
Copper	2.0
Magnesium	0.4

British standard alloy for wire and rivets.

R.R. 77 (T)

Aluminum	88.9
Zinc	5.0
Copper	2.3
Magnesium	2.5
Nickel	1.0
Titanium	0.3

British standard extruded alloy for structural work of high strength.

SEEWASSER

Aluminum	95.0
Magnesium	2.3
Manganese	2.5
Antimony	0.2

Developed by Karl Schmidt, Neckarsulm, Germany, for resisting marine corrosion.

SILAL V (T)

Aluminum	97.2
Magnesium	1.2
Manganese	0.8
Silicon	0.5
Titanium	0.3

One of a group produced by Edward Hueck, Ludenscheid, Germany, for rolling and extrusion.

SILMELEC (T)

Aluminum	97.8
Magnesium	0.6
Manganese	0.6
Silicon	1.0

Developed in France especially for electric conductor wires.

SKLERON (T)

Aluminum	82.5
Zinc	13.0
Copper	3.0
Manganese	0.7
Lithium	0.8

Originally developed by Czochralski and the Metallbank in Germany as a "Zinc Duralumin", lithium

taking the place of magnesium. Only in limited use.

STUDAL

Aluminum	97.7
Magnesium	1.0
Manganese	1.3

Promoted in France by the Studio des Alliages Legères as a general purpose sheet and tube alloy.

TELEKTAL (T)

Aluminum	97.8
Silicon	1.6
Iron	0.5
Lithium	0.1

Produced in Germany as an electrical conductor alloy.

THALASSAL

Aluminum	95.0
Magnesium	2.3
Manganese	2.5
Antimony	0.2

French equivalent for Seewasser alloy.

ULMAL (T)

Aluminum	97.0
Magnesium	1.25
Manganese	0.8
Silicon	0.9

German equivalent to Anticorodal, produced by the Wielandwerke A.G., Ulm.

ULTRALUMIN (T)

Aluminum	94.3
Copper	4.7
Nickel	0.2
Manganese	0.8
Cerium }	tr.
Thorium }	

Forging alloy developed by the Ultralumin Leichtmetall A.G., Germany.

VIVAL

Aluminum	98.6
Magnesium	0.6
Silicon	0.8

Anticorodal type developed in France by the Société Française des Métaux, Paris.

Y ALLOY

Aluminum	92.5
Copper	4.0
Nickel	2.0
Magnesium	1.5

Standard British alloy for forgings and parts for heavy duty, pistons, etc.



A LUMINUM alloy sheet being formed in a sheet metal brake.

Defending America

By COL. H. A. TOULMIN, Jr.

THIS is the third of five articles on the subjects now under strict scrutiny by the American people—industrial and military mobilization. In the July 18 issue Col. Toulmin in forceful language sketched the political and mental rehabilitation necessary for American defense; and in the July 25 issue attention was directed to military phases of the problem and ineptitude in the securing of supplies. Herein, the author considers the strategic demands for an adequate defense of America.

ing or evading responsibility and of relying upon democratic theory, it will be lost.

Nature has generously endowed the United States with the greatest chain of natural fortifications in the world. All that we have to do is to take advantage of what nature has provided and we will find ourselves within the ramparts of an impregnable citadel.

To build a navy adequate for the defense of the Atlantic would take from two to four years. To build this chain of defensive establishments on the islands of the Caribbean and the Gulf of Mexico territory would take scarcely more than a year. Both should be operating simultaneously. But the immediate and urgent defenses are those of the air corps, and the efficiency of the air corps as defenders will depend on the number of overseas bases in these islands which are available to the United States.

The difficulty of the United States is that it is imperiling its own safety and selfish interests by a continuation of an altruistic policy as to the nations in Central and South America and such nations in the Caribbean who have establishments there. First and foremost should come the protection of the United States.

The price of our assistance to South America or abroad must be the grant to us of the right first to protect America as a base for that assistance. Without such protection, the guarantee of

such assistance is substantially meaningless for the persons and countries guaranteed. Therefore, if we wish to protect this hallowed cathedral of our democratic empire, we must change our colonial policy to an acquisition of territory bordering upon the United States to the extent necessary for naval, air and military protection.

These territories should be secured by negotiation and treaty or by purchase; and if these fail for the protection of America, then they should be acquired by force. It is the lack of such forceful and aggressive movements that should have been taken for the protection of the countries in Europe that has permitted the present conditions to arise. It is because of taking such action that the German Empire is now being built again. In a world of force, the only thing that counts is equal and greater force and greater aggressiveness. The era of advice, negotiation, respect for treaty and of law has passed and the only survivor is the one who survives on the basis of the greater force and the greater protection.

Defense Bases

There is no reason why we should not exercise a mandate over all these western hemisphere possessions of subjugated nations for those unable to adequately defend them as a part of our general duty to preserve the peace of the western world.

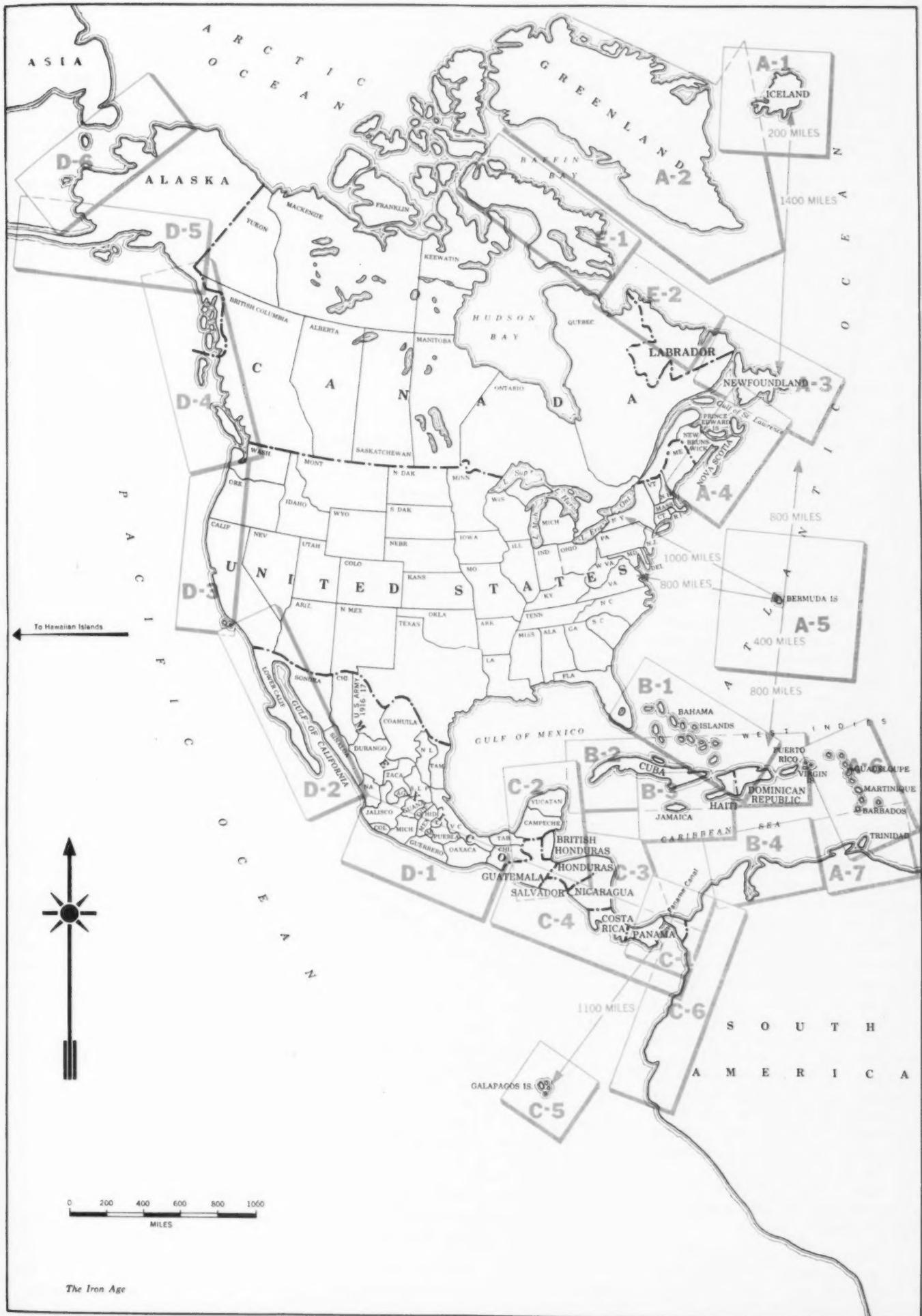
Consider now the map on page 43, starting at the right-hand top. There

"THIS hemisphere is safe from any aggression from abroad just as long as two conditions maintain:

(1) That the Panama Canal is open for the transit of the United States fleet.

(2) That an aggressor from abroad has no bases in this hemisphere from which to operate."—George V. Strong, Brigadier General, Assistant Chief of Staff, United States Army, May 6, 1940.

The United States has a plain course of action. Its empire must be preserved by bold and vigorous steps. If it makes the mistake of compromis-



The Iron Age

is a series of aircraft, submarine and naval bases constituting our first line of defense on the Atlantic seaboard, consisting of Iceland, Greenland, Newfoundland, Nova Scotia, Bermuda, the Virgin Islands, Guadeloupe, Martinique, Barbados, Trinidad and Venezuela on the north coast of South America. No nation should be permitted to own or gain a foothold on this chain of defenses of the Americas.

Nature has given us a whole series of unsinkable aircraft carriers in the form of these islands and promontories scattered along our coast from a few miles to a thousand miles at sea. No fleet of an invading enemy and no invading air corps would be in a position to attack the United States if it could not use this chain of primary defenses as supply bases, submarine bases and airports.

Correspondingly, no fleet or invading force, whether coming on air or by sea, would dare expose its flank to the attacks that could be launched under seas, on the seas or in the air from this chain of bases.

These bases should be fortified, and held and controlled by the United States as a matter of elementary salvation. They should be equipped with a series of alternative air fields, underground airdromes, hangars, machine shops and vast storage supplies of water, food and munitions. They should be armed against air and naval attack and be equipped to supply the units of the fleet, both sea and air. This country is now converting old destroyers into seaplane tenders in order to get supplies to seaplanes rapidly at great distances from home shores. These islands provide the same service but only to a very far greater efficiency.

The lines drawn about these chains of natural fortifications on the map indicate normal flying zones and controlling zones in the sea, on the sea and in the air. These supplemented with mine fields, a small navy for the Atlantic and a system of communications with the support of a large continental air force operating from continental bases constitute America's impregnable defenses. In this tense international situation the country cannot afford to wait until four or five years for the completion of our Atlantic navy. The equivalent of that navy can thus be secured for defensive purposes within a year.

Turn now to the secondary line of defenses—a Gibraltar for controlling the Caribbean Sea, Gulf of Mexico and for protecting the Panama Canal,

the most vulnerable spot in America. First, there are the Bahama Islands—a chain of natural fortifications extending diagonally from the tip of Florida and adjoining on the south the east and west group of Porto Rico, the Dominican Republic, Haiti and Cuba, which extend to an area adjacent to Yucatan, Mexico. These islands constitute a natural barrier at the entrance into the Gulf of Mexico for access to the oil fields of Mexico and of Texas and Louisiana. (See map on page 41.)

Southward the area, B-3, Jamaica, a fortress in itself. It lies within a two-hour plane flight from Panama. It is 99 per cent black in population, and warning has been given of a negro uprising. The blacks have been told that under German rule their misery of bad crops and hurricanes would disappear. It is not the first time that a foreign nation with an outpost in the Caribbean Sea has lost it to the natives when that nation is reported to be losing a battle at home.

Jamaica's harbor, Kingston, is one of the finest in the West Indies and only 600 miles from the Panama Canal. Some idea of its size can be gained from the fact that at the beginning of the war, Britain had a convoy fleet of 70 ships in this harbor at one time. The area marked B-4 on the north coast of South America is the last of these secondary defense areas which should be similarly fortified. All of these points are within easy flying distance of one another and are regularly flown by the major air lines.

Now consider the Panama Canal defense areas themselves. The first and foremost is the Panama Canal and its adjacent military areas marked C-1. South of it is the western coast of South America, C-6, which must be dominated to protect the canal. Southwest of it is a potential base, C-5, the Galapagos Islands—1100 miles from the canal. But most important of all are the areas C-3, embracing Costa Rica, Nicaragua and Honduras, and the corresponding area C-4, on the Pacific side of Central America. One of the most important of these is the area, C-2, embracing Guatemala, Salvador, Honduras, British Honduras and that portion of Mexico embracing Yucatan and Campeche. These are areas which require air bases, naval bases and complete domination. The very least necessary is to ensure that these territories are sterile of any military, naval or air establishments. These zones constitute prohibited zones within which no ad-

verse power should be permitted any influence.

Defending West Coast

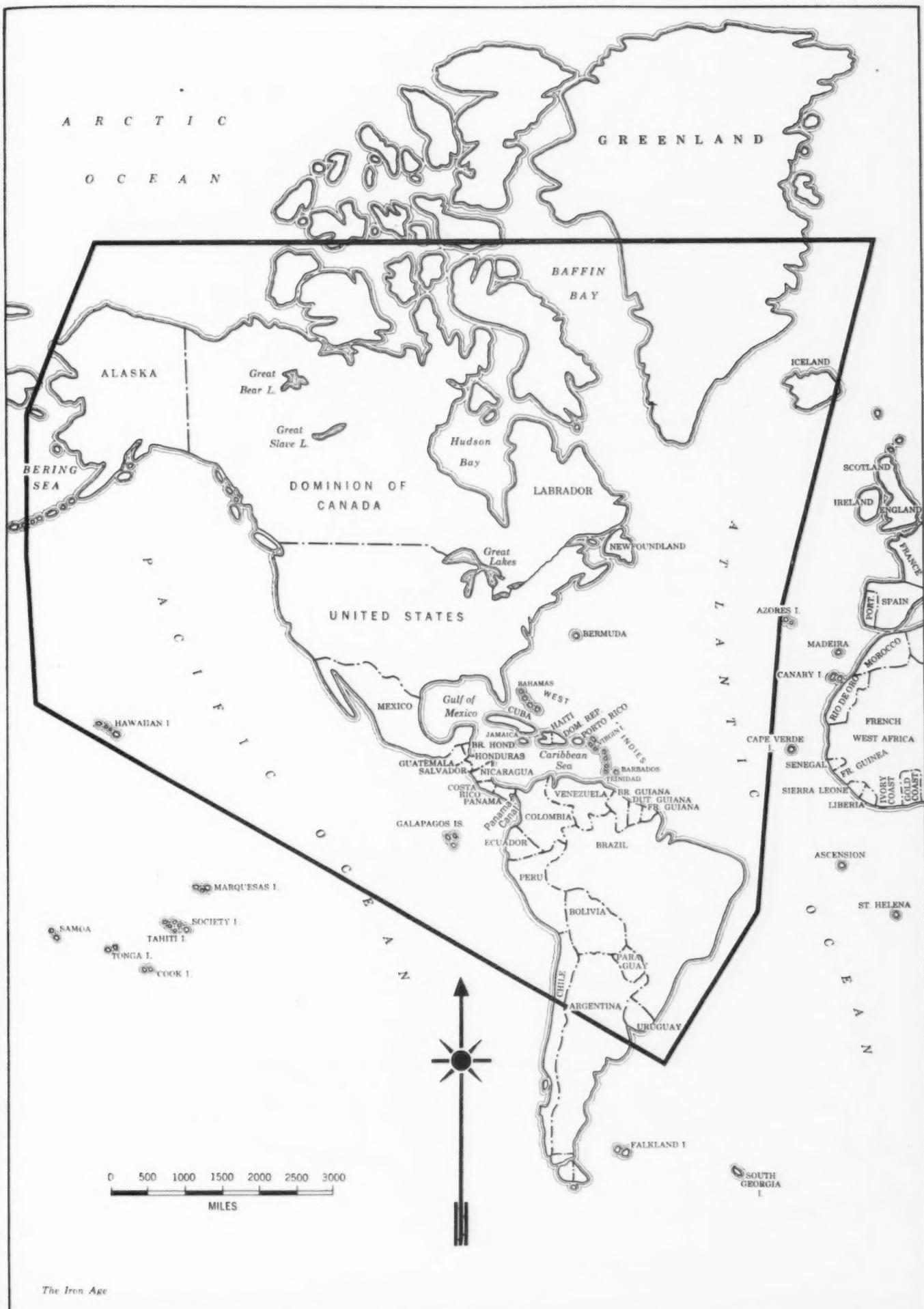
Turning to the western coast, interest should be given to the areas D-1 and D-2, as those which must be prohibited to any activities of foreign nations. They provide landing bases, supply bases, air fields and good harbors, in a rich and turbulent country such as Mexico. The greater the improvement in Mexican roads the greater the danger to the United States.

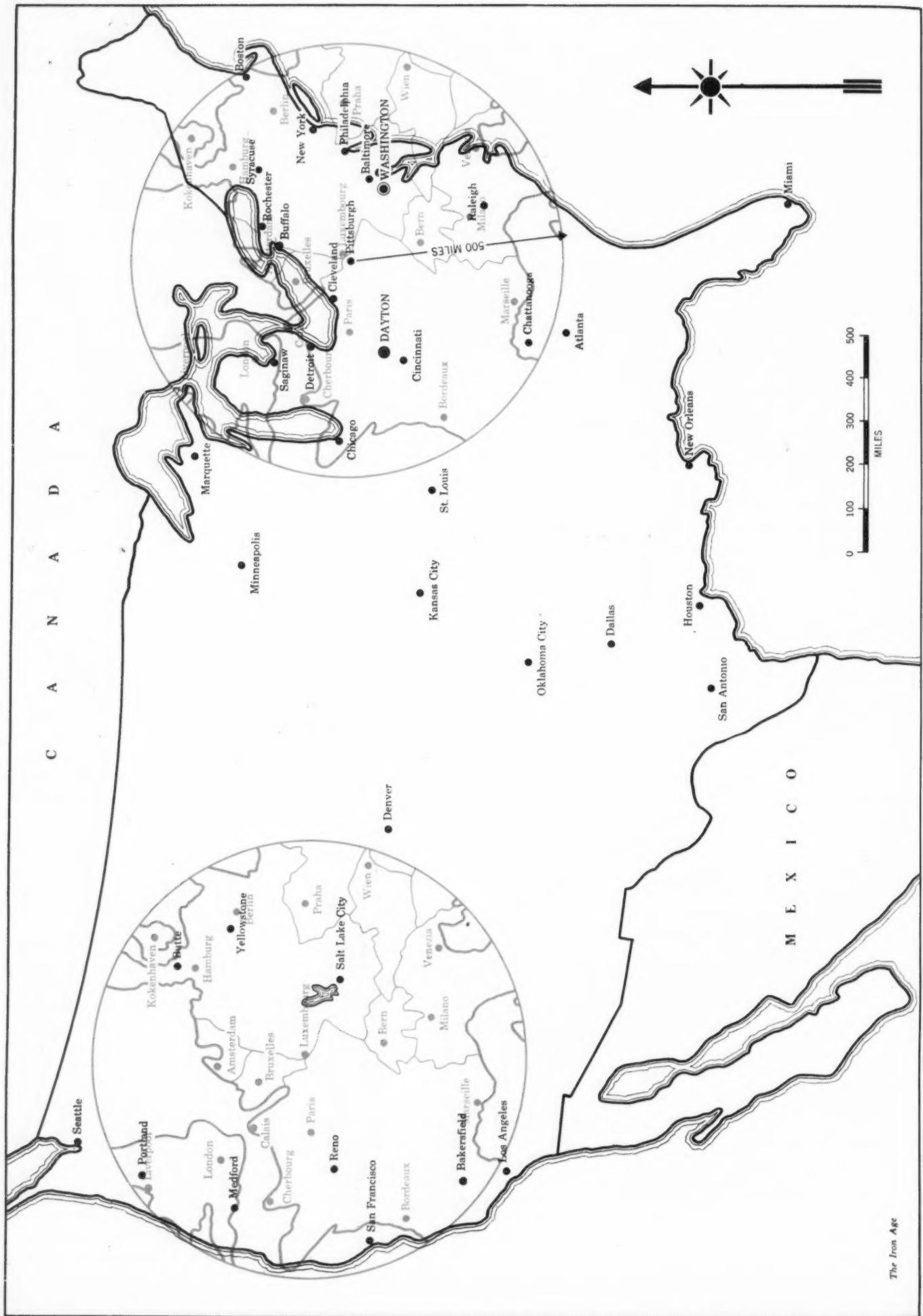
The first motorized expedition of the United States, which went into Chihuahua in 1916 to chase Villa, penetrated nearly 400 miles into Mexico without roads. Imagine the difference between the 1916 cars and trucks without roads and the 1940 cars and trucks in Mexico with roads. These western coasts of Mexico are particularly vital because they constitute approaches to the areas D-3 and D-4 of the Pacific coast and the long indented coast of British Columbia.

Next consider the areas D-5 and D-6 on the coast of Alaska, vulnerable to Japan and Russia. Fort Davis, near Nome, Fairbanks and Anchorage are vital posts under the shadow of Japan and Russia. On the tip of Alaska is Dutch Harbor, a far-flung outpost of our empire. On this life line of our defense is Pearl Harbor in the Hawaiian Islands and from thence the life line passes just south of Galapagos Islands (Area C-5) to Ecuador at the end of area C-6.

It should not be forgotten that there is only 54 miles between the Alaskan mainland and Russian Siberia, where the latter has constructed an air base. The Aleutian Islands on the tip of Alaska are a series of stepping stones only 660 miles from Hormomuschio, Japan's eastern naval and air base, while the distance from Honolulu and Japan is 3400 miles. Air and naval bases are now being established in Alaska which should constitute a major reconnaissance force in the Orient. If Alaska were heavily equipped and richly populated as a thriving, vigorous nation, its threat would keep Japan quiet in the Far East.

Turning back to the Atlantic coast, there are two very vital soft spots in the defense of the Americas. The first is the Gulf of St. Lawrence, guarded by Newfoundland on one side and Nova Scotia on the other. France has two Canadian outposts in the Islands of St. Pierre and Miquelon. These two islands are strategically





placed in this eastern gateway to Canada. At Halifax is one of the world's greatest naval bases and harbors. It is so large that no other word describes it except "magnificent."

The harbor of St. Johns in Newfoundland is substantially impregnable as the gateway to it is dominated by towering stone cliffs. Here is refuge and supply for ships of sea and air. But there is even a more important naval base south of St. Johns in one of the greatest harbors in the British Empire. It has in times past held a substantial portion of the entire British fleet at one time. On this wild, rugged and turbulent coast, shrouded in fog, there is thus an ideal base of operations for an enemy; and it is up to the United States to protect this base of operations from enemy possession.

Further to the northwest lies one of the most important areas for attack upon North America. It is the entrance to Hudson Bay north of Labrador and south of Baffin Bay. This whole inland sea extends into the very heart of Canada to a point within several hundred miles of Lake Superior and Michigan and within easy flying distance of Canadian industrial districts and even some in the United States. During certain months of the year this Bay is already the terminus of ocean traffic fed by a railroad line from southern Canada.

When this country talks about a navy with battleships and aircraft carriers, it must also think in terms of this great land navy of islands and promontories firmly anchored in unsinkable condition in these outposts at sea. There should be less worry about the Philippines and their fortification a few miles off the coast of Asia and more worry about taking care of home defenses on rich and important islands at the very gateways of America.

This is the strategy of the American empire.

These outposts can be fortified and occupied long before nine-tenths of the new navy will be complete, at a cost far less than this navy, and such fortification will be for *defense*—not attack. To do this there should im-

mediately be established an "*Over Seas Command*."

Seize the Outposts

When any European nation becomes subject to the totalitarian powers or is unable to meet its obligations to the United States, it is a logical outcome of the Monroe Doctrine that the United States must take and occupy for the preservation of the peace in the western hemisphere, these outposts that legitimately must come within its influence. Otherwise the United States is lost. God helps him who helps himself.

Now turn to the map on page 44, showing the relative distance in Europe as compared with the area bordering the Gulf of Mexico and the Caribbean Sea. As the reader is familiar with the military and air operations in Europe he can see how easy such operations can be conducted against the United States if foreign powers possess the Lesser Antilles which are British and French. This chain of islands would dominate American owned Porto Rico and Virgin Islands. British Trinidad is in this group.

To the southeast of that is British Guiana and French Guiana, while at the west is Venezuela, Colombia and Ecuador. In the very heart of this territory is British Jamaica and the restless black territories of Haiti and San Domingo, and the almost equally turbulent Cuba. Dominating Cuba and the Florida coast at the very gateway to the Gulf of Mexico are the British Bahama Islands while Bermuda is in almost daily air communication with the United States by means of ordinary civil aviation. Opposite British Jamaica is British-owned Honduras.

The establishment of credits in South America, the promotion of reciprocal trade relations and attempted cartels, are all milksops and stop gap remedies—South America is no different from Europe—the only thing that counts is force and respect for force. South America will go along with the United States just so long as the United States is the most powerful military nation in the western hemisphere—and no longer. This

country has already established these outposts of empire at Guantanamo Bay in Cuba, at Porto Rico and the Virgin Islands. It should complete the domination of the territory.

It is quite significant that the Nazi uprising in Uruguay was squelched by the presence of a cruiser or two at Montevideo and across the river at Buenos Aires. Battleships talked bigger than banks in South America.

Consider now the infiltration of Germans and Italians already effected by the totalitarian powers. Here is a reasonable tabulation:

Country	Germans	Italians
Venezuela	3,000	1,500
Colombia	4,000	1,600
Ecuador	4,000	1,500
Peru	3,000	7,000
Bolivia	50,000	10,000
Chile	16,000	11,000
Paraguay	15,000	2,000
Argentina	3,000,000	250,000
Uruguay	100,000	8,000
Brazil	2,000,000	2,000,000

There are four critical areas in South America that must be dominated to protect South America. The area of the Panama Canal to and inclusive of the Amazon River. The area from Natal to Bahia and Rio de Janeiro. The area including Uruguay, Montevideo and Buenos Aires at the mouth of the Platte River. On the west coast the control of four cities controls the entire coast.

In Brazil there are 5,000,000 totalitarians out of a total of 43,246,931 population and there are German news agencies serving many of the South American papers and German-owned radio stations dot the country. Nazi organizations are reported to be very effective there. Their storm troopers beat up Germans who will not cooperate. Air lines are run by Germans both in Brazil, Columbia, and other South American countries. Germany is reported to have an air base at Trinidad, and in Bolivia. The Bolivian army is trained by German and Italian army officers. Similar missions are understood to have been effective in military and naval circles in South American countries, and this is the peaceful South America whose friendship we are trying to buy with \$20,000,000.



Heat Treating Industrial



DUUE to the smaller quantities involved and a greater diversification of sizes, the heat treating of industrial gearing offers a thousand problems for each thousand gears, whereas in the automotive industry, as an example, it may be said that there is one problem for each thousand. The very fact that the number of materials and treatments involved covers the entire range does not simplify matters. The photographs accompanying this article—which do not show either the largest or the smallest gears regularly heat treated—will give some idea of the product variation. Of interest is the fact that 95 per cent of Westinghouse industrial gearing products are hardened (the term "heat treated" covers everything from stress relieving to annealing).

For standard products the author's company has standardized on carbon steel wherever practical. It has the same physical properties for the same hardness as alloy steels and has the advantage of lower cost. Carbon steels are not suitable for extremely small gears, and for those a full hardening or carburizing grade of alloy steel is used.

The types of treatments may be divided into three general classifications, fully hardened, hardened and tem-



FIG. 2—If the hub of this locomotive gear is cooled slowly to keep it machinable the differential cooling rates, distortion, etc., tend to push the hub out and pull the gear tapered.

• • •

pered to within a machinable hardness, and case hardening.

Fully hardened—above 400 Brinell—gearing is used where the loads and space available require the greatest strength and longest life. If distor-

tion is a factor, alloy steel or grinding after hardening is resorted to. An example of this class of gearing is shown in Fig. 1. These three mating gears are loaded for above ordinary practice and require the utmost in strength and wear life. All must be within 429 to 495 Brinell hardness and are ground all over to obtain the maximum tooth contact area and necessary accuracy. All are of carbon steel, yet in spite of the variation in size they harden to the almost unbelievable figure of 601 Brinell after quenching but before tempering. Each represents a problem in itself not only because of the difference in size and shape but also from the necessity of controlling distortion and shrinkage to reduce grinding time.

Most of the fully hardened gearing must be keywaved after hardening for the requisite accuracy of keyfit. This requires that the bores must be kept within the machinable range of hardness during quenching—this is a problem in itself. With the technique that necessity developed and the experience of 30 years there is seldom any difficulty, though each case must be studied in the light of the requirements.

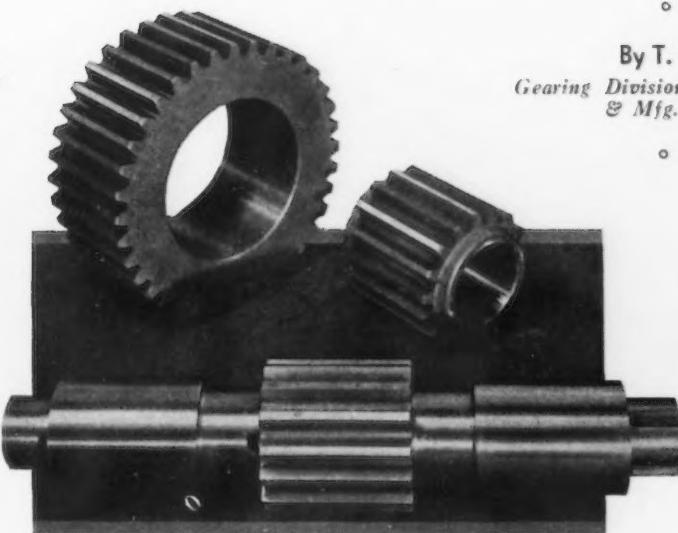
Another interesting case of this type is represented by the gear for a high speed locomotive shown in Fig. 2. Reamed holes for body fitting bolts

Gears . . .

and an accurate pilot fit for the mating quill flange require that the hub and web be kept soft after quenching. This would not be difficult if it were not for the peculiar shape of the web, the offset hub and its size with relation to the web. All of these factors are negative advantages in that if the hub is cooled slowly to keep it machinable the differential cooling rates, distortion, etc., tend to push the hub out and pull the gear rim tapered. The result in extra grinding time and lack of dimensions to be machined can be pictured readily. The problem was cared for in a unique way which was developed after considerable study and experimentation. After quenching in the BP solution for a predetermined length of time to obtain the necessary high rim hardness the gear is removed from the quench, the quenching fixture removed and the entire gear put in an oil bath to fix the position of the hub by relatively fast cooling without hardening. Between the technique and the split second timing team-work of the heat treaters, the hub is at a real heat when the gear goes in the oil yet the rim is fully hardened and cold.

When a high degree of accuracy is required for high speed operation and load capacity and the increased cost of larger gears less than that of grinding the teeth—if that is possible—gear and pinion blanks are hardened and tempered to a hardness such that machining after treating is possible. The load capacity strength and wear resistance of gear teeth is, of course, directly proportional to the hardness, and by raising untreated material of 167 Brinell to between 250 and 300 Brinell hardness all of those factors are raised likewise.

Ten years ago a hardness of 225 Brinell was considered the maximum that could be machined. Ten years of development in the art of heat treating and of improvement in cutting tools have increased that limit to the



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point where teeth in carbon steel gears can be hobbed at 311 Brinell and in alloy steels at 350 Brinell—not as stunts but as regular commercial and economical practice. Most of the gearing in gearmotors and speed reducers have the teeth cut after the blanks have been hardened and tempered to within the machinable range of hardness.

Smaller pinions, where a high surface hardness is required and where the size will not permit a drastic quench, are case hardened. An alloy steel is used for the standard grades for the increased core properties. Fig. 3 shows a recent installation of a slow cooling unit, carburizing and tempering furnace. The carburizing furnace operates on the principle of obtaining

the carburizing atmosphere by cracking a specially compounded oil in the furnace at the high carburizing temperature.

This type of furnace eliminates the former laborious but necessary packing of the work in the carburizing pots, the additional time required for heating the pots and compound in addition to the work and allows quenching direct from the furnace. All of these factors not only reduce costs but result in improved quality. This installation is part of a long term program of keeping up to date in the heat treating department by adopting modern methods and installing new equipment when developed and proved in practice.

FIG. 3—A recent installation of a slow cooling unit, and carburizing and tempering furnaces.



The Why and How of Ball Burnishing

THE function of burnishing is to produce a brightly finished surface through mechanical operations at a lower cost than is possible when hand labor is employed. *Burnishing* should not be confused with *rolling and tumbling*, both of which employ cutting action either by the action of the parts on themselves or through the medium of a cutting agent.

Parts may be burnished to eliminate a buffing operation before electroplating, and as a finishing operation after plating. There is also a large variety of articles which are not plated and the burnishing operation provides the only finish they receive.

Burnishing carries out the full meaning of mass production in the manufacture of small parts, as it makes possible the finishing of parts in bulk.

Burnishing produces no cutting action and the procedure *will not* remove scratches, pits or irregularities from the surface of the parts.

Burnishing peens down, flattens and spreads out the surface and the more completely this operation is accomplished, the brighter the surface will be. In burnishing, the polish on the work is developed by an infinite number of impacts on the work by the burnishing balls and also by the rubbing action within the rolling mass under pressure.

Many factors enter into the problem of successful burnishing and great care should be exercised in analyzing each job.

The work must be prepared for the burnishing operation and the first preparatory step should be cleaning. This is very important, as any particles of oil, grease, rust or foreign matter carried into the barrel on the work will retard or prevent the desired results. The cleaning operation may entail several operations in itself, such as cleaning to remove oil and grease, pickling to remove rust and scale and bright dip to remove tarnish, for while bur-

nishing builds and improves the surface it does not greatly improve the color.

The next step should be a proper classification of the work and the establishment of a proper formula for each class. This formula calls for the proper selection of burnishing agents as to size and shape, barrel speed, burnishing solution, shape and size of the barrel, hardness of agents versus hardness of work and barrel lining.

Hardened steel balls are as a general rule used as burnishing agents but to

quired to burnish the work, but they do a better burnishing job. Smaller balls exert less pressure on the work and have a tendency to prevent light work from floating; also, small balls provide more contact with the work. In other words, the impacts from the smaller balls are lighter but the number of impacts is greater, therefore, a smoother and more uniform surface is obtained.

The shape of the work or its weight per cu. ft., the kind of material, whether it is steel, brass, aluminum or die casting, are all factors to determine the amount of balls to be employed. The idea is to have sufficient balls to fill all the voids and make the mass flow uniformly, and each piece should be supported by the balls. For example, consider a cu. ft. of steel stampings weighing 50 lb. A cu. ft. of burnishing balls weighs about 350 lb. Therefore, to this cu. ft. of stampings should be added 300 lb. of balls to get a voidless mass. If the parts were forgings and weighed 200 lb. per cu. ft., there would be required only 150 lb. of balls. Of course, it is better to use too many balls than not enough.

Floating of the work may cause distortion or nicking because of the parts hitting one another. This may be corrected by slower barrel speed, more completely filling the barrel or by using smaller burnishing agents, or a combination of all three methods.

Ball burnishing is applicable to practically all metals and a burnished surface is very hard. Hard electro-deposits will take a better luster than soft deposits. Burnished plated surfaces will stand more hours salt spray than wheel polished surfaces.

Foreign matter in the burnishing barrel adheres to the surface of the balls and is rolled onto the work and makes a high finish impossible. If and when trouble of this type is encountered the work should be removed from the barrel and cleaned. Also the barrel and agents should be thoroughly cleaned with a hot cleaning solution

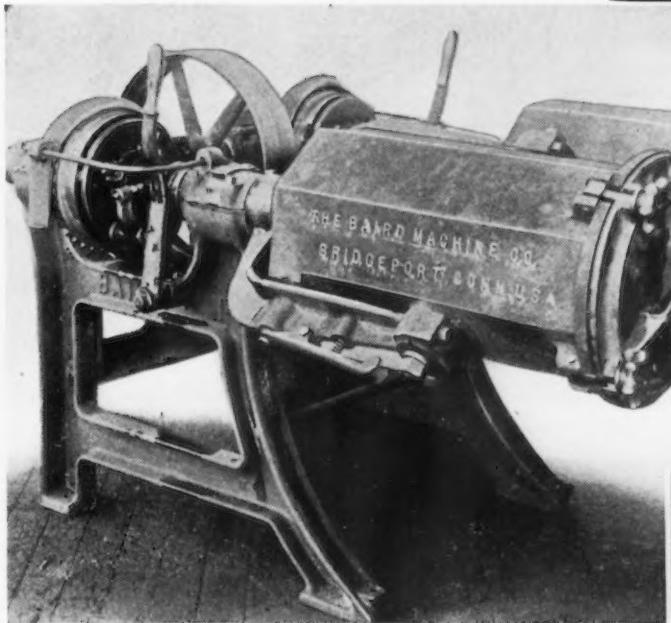
By FRANK T. MANN
N. Ransohoff, Inc., Cincinnati

meet special conditions, agents of many shapes and forms are used. Balls and agents of irregular forms are often used in combination to give the desired results.

To obtain satisfactory results in burnishing, it is necessary that the mirror finish on the burnishing agents be maintained. Rusty, rough balls will not give perfect burnishing results, they will cut, scratch and pit the work. The size of the balls depends on the design of the piece to be burnished. If the work has a perfectly plain surface, large balls may be used to advantage, but if the surface carries figured designs, crevices and small corners, balls must be used that are small enough to enter these places. In some cases it is advantageous to use a combination of balls with cones, pins or slugs.

All sizes of balls weigh very nearly the same per peck or cubic foot. The smaller the size the more expensive the balls are and the more time re-

SEVENTEENTH in a Series of Articles on the
Technical and Economic Aspects of Metal
Cleaning and Finishing



ABOVE
TWIN barrels
of greater
length than diam-
eter. Machine
made by Baird
Machine Co.,
Bridgeport,
Conn.

• • •

and followed with several cold rinses to remove all traces of the cleaning solution.

The time of a burnishing operation varies with the hardness of the surface of the work, its shape, weight, the finish desired, the speed and the diameter of the barrel.

The nature of the work and the size of the barrel determine the speed at which the barrel may rotate—the peripheral speed varies from 60 to 200 ft. per min. The faster the rotation, the greater the number of impacts made by each burnishing ball. There is a limit, as too much speed will develop too much pressure and damage the work. Small regular shaped pieces can be run faster than large irregular shaped pieces. Light frail work with sharp edges and corners must run slowly.

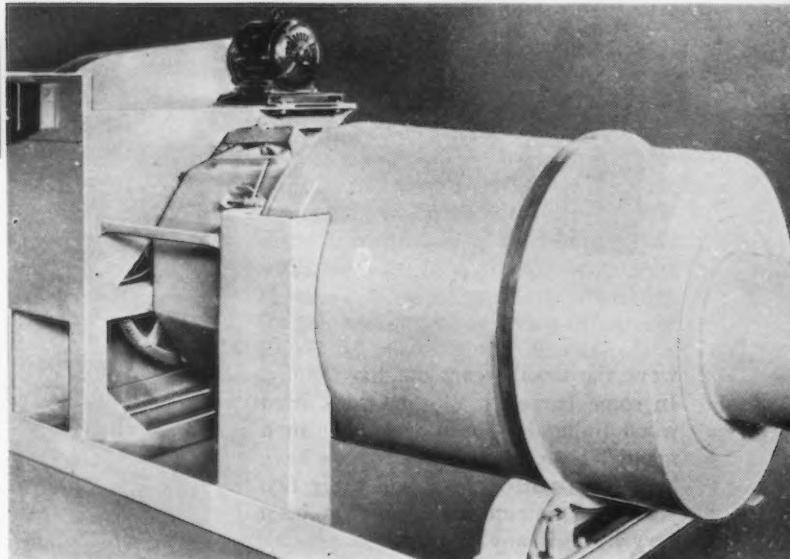
The work may be brass, steel, aluminum or die castings. The best possible finish is demanded in the shortest possible time, and to develop this in a burnishing barrel a lubricant is necessary. It is very important that the proper lubricant be used, and in addition

to being a lubricant it must remove a small amount of tarnish or oxidation or other foreign material taken into the barrel with the work. Furthermore, it should prevent oxidation or tarnish of the work during burnishing and should also keep the burnishing agents clean and bright. The usual lubricant used is soap.

Soaps are made from a wide variety of oils and fats, such as whale oil, fish oil, lard oil, palm oil, cottonseed oil, peanut oil, tallow and so on down a long list of oils and fats. There are also other methods of making soap

DISCHARGE end view of an automatic
unloading ball return burnishing barrel.
N. Ransohoff, Inc., machine.

SIDE loading and unloading automatic ball return
burnishing barrel. N. Ransohoff, Inc., machine.



that employ the use of rosin, ammonia, etc. These soaps may be neutral, acid or alkaline, hard or soft.

The above mentioned bases and methods of making soap make it very plain that commercial soaps all vary in their chemical properties. They may also contain fillers and builders that are detrimental to good burnishing.

Steel and iron should be burnished in an alkaline solution, while copper, brass, aluminum and die castings should be burnished in a mild acid solution.

Cyanide increases the alkalinity and

its use in burnishing steel speeds the operation and improves the color and caustic soda will do about the same in burnishing cast iron.

For burnishing aluminum a very good lubricant is a small amount of Orvus Flakes and enough oxalic acid to keep the acidity slightly below pH. 7. The best burnishing solution to use depends also on the composition of the aluminum alloy.

For a great many years hard wood has been the accepted lining for burnished barrels, but at present burnishing is being done, with very good results in steel, bronze and rubber lined barrels. Wood is a very excellent lining for light work but for heavy

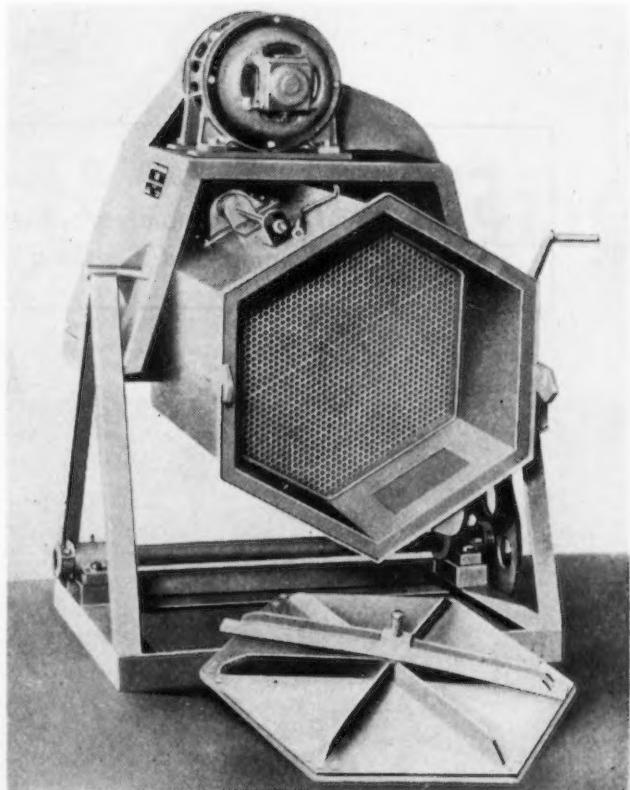
RIGHT

AUTOMATIC tilting ball separating burnishing barrel. N. Ransohoff, Inc., machine.

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BELOW

DOUBLE cone shaped cutting down barrel. Machine made by Hartford Steel Ball Co., Hartford, Conn.



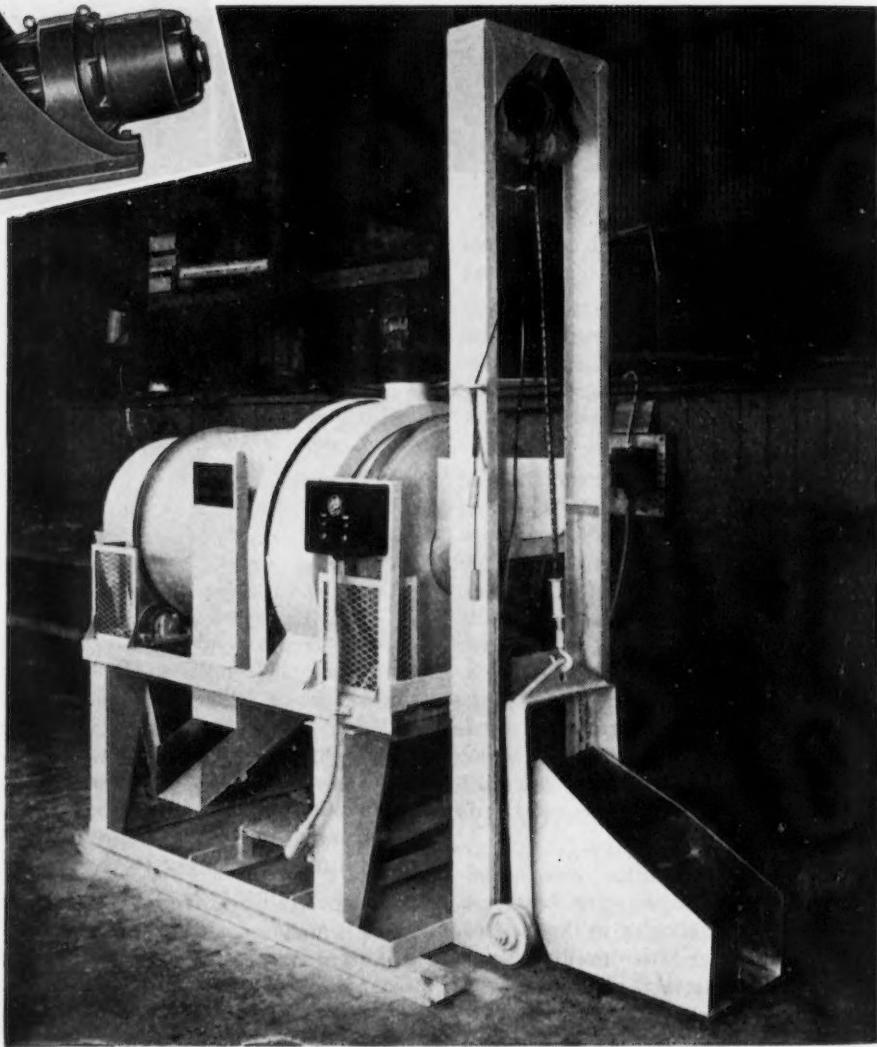
work the wood wears out too rapidly. In some barrels a $2\frac{1}{2}$ in. thick hard wood lining has been worn out in a month's time. These same barrels have been lined with rubber and after two years the amount of wear has been very little, if any.

So far only the various types of burnishing materials and solutions best adapted to different types of work and to different metals have been discussed. The design of the barrel itself is also important in producing the best results in the shortest possible time.

• • •

RIGHT

AUTOMATIC load and unload cutting down barrel with automatic star return and power loader. N. Ransohoff, Inc. machine.



Cutting down or rolling preparatory to burnishing is usually done in one of three types of barrels. Small batches can be readily handled in tilting barrels, usually multisided and tapering toward the top. These barrels are inexpensive and well adapted to handling batches of light work up to $1\frac{1}{2}$ cu. ft. Above that amount loading and unloading becomes somewhat of a chore.

For long cutting down operations of work in medium sized batches, a horizontal barrel is on the market which loads through a door in the side. This barrel is of the double cone type, multisided, and tapering from the center to the ends. This construction gives a double action to the work from the ends to the middle and over and over in the middle, resulting in rapid cutting down.

A horizontal barrel is also built which loads and unloads automatically, thus eliminating the labor involved in loading and unloading the work. This barrel rotates on rollers and has the loading and unloading openings in the center. It is so constructed that when rotating in one direction the load remains in the barrel and when the direction of rotation is reversed, the work is automatically discharged. A low worm welded to the shell inside the barrel gives the work a double motion, over and over and from end to end. This increases the cutting down efficiency as well as emptying the barrel completely when it is run in the discharge direction. These barrels may be equipped with power loaders, taking a batch of work from ground level and charging it automatically into the barrel.

They are also built for cutting down

the work with foundry stars, hardened slugs or any similar medium in addition to the abrasive. When built to work with a medium of this kind they are equipped with a patented discharge head, separating screen and retaining cone, so that the medium is automatically separated from the work during discharge and automatically returned to the cutting down compartment ready for the next batch of work. This construction permits the economical use of a large amount of cutting down or tumbling medium which produces quick results with a minimum amount of nicking.

Burnishing barrels are built in two general types—large diameter with short length—small diameter with greater length. Each type has its distinct advantages for certain classes of work.

Since the pressure of the balls on the work is proportionate to the depth of the mass, the pressure will be greater in a barrel of larger diameter; consequently barrels of this type work faster than those of smaller diameter. Certain very delicate work may, however, be distorted by the pressure of the balls in a barrel of large diameter, and for work of this type a barrel of smaller diameter and greater length is recommended. Certain other classes of work have a tendency to tangle in the barrel. This applies particularly to very long and slender pieces. Work of this type should be burnished in a barrel whose diameter is considerably less than the length of the work. This will prevent the pieces from "standing on end" and keep them parallel.

Burnishing barrels as well as cutting down and tumbling barrels are built for automatic discharge, auto-

matic ball separation and automatic ball return. Except in special cases these burnishing barrels load from the side, which permits the barrel to be loaded above center. This is advisable in burnishing to prevent any dropping of the work and insure a smooth flowing action as well as to increase the pressure of the balls. In barrels of this automatic type, when the burnishing is completed, the direction of rotation of the barrel is reversed. This automatically discharges the work and separates the balls during discharge. The balls are retained in the cone which surrounds the separating screen and returns to the burnishing compartment automatically when the barrel is again run in the burnishing direction.

Since the weight of the balls usually far exceeds the weight of the work, handling the balls automatically greatly reduces the labor required in the burnishing operation. Furthermore, since the balls never leave the barrel the loss of this expensive material is reduced to a minimum.

An article on burnishing would not be complete without a few words about "fixed burnishing." This method is used to burnish work of such a size and nature that it will not stand mass burnishing. In fixed burnishing, the parts are mounted on a jig or fixture and held in a fixed position in the barrel. The burnishing is accomplished by the balls flowing past the work. The barrel must be reversed so that the balls will reach both sides of the work. Fixed burnishing is not as generally used as yet as mass burnishing. However, it offers great opportunities for the economical finishing of certain classes of work.

Vicalloy—A New Magnetic Alloy

VICALLOY, a new magnetic alloy of remarkable qualities, was recently announced to the American Physical Society by E. A. Nesbitt and G. A. Kelsall, of Bell Telephone Laboratories, New York. Composed of cobalt, vanadium and iron, it is said that the alloy can be made to hold more permanent magnetism than any commercial material. In addition, it can be drawn and rolled—a property of decided advantage in many applications, and not possessed by

other permanent magnet materials of importance in the art. For example, it has been rolled into tape $1/500$ in. thick and $1/20$ in. wide; several thousand feet of this tape are used for sound recording at the New York World's Fair, while shorter lengths are running constantly as endless loops in the Bell Telephone weather-announcing systems.

Taking its name from the initial letters of its three components, the new material is composed of 6 to 16 per

cent vanadium, 30 to 52 per cent iron, and 36 to 62 per cent cobalt. From the molten state it is cast into an ingot, which is hot-swaged to $\frac{1}{4}$ in. diameter. It is then drawn into wire or rolled into tape, as desired. When in final form, it is heat treated to develop its magnetic qualities. It is permissible to use a heat treatment that will not be harmful to most high-permeability materials. Thus it is possible to weld pieces to the magnet and heat treat them both together.

Gray Cast Iron

—A New Heat Treatment

GRAY iron is one of the most widely used engineering metals. It has also been one of the more neglected metals. Until recently the interests of both the mechanical engineer and the metallurgist have been at a low level wherever the development and increased application of cast iron has been concerned.

Outside of production technique and alloying practice, cast iron has come to be taken for granted, its uses governed by convention, its properties accepted, and many of its possibilities to a large extent overlooked. Not until the advent of welded fabrication in machine tools was it realized that cast iron was, in many cases, better because of its high damping capacity rather than because it had always been used.

It has been generally known for a long time that cast iron, as cast, makes a fairly good bearing metal but recent work has scientifically demonstrated that cast iron properly heat treated makes a good bearing metal. The considerations of the wearing characteristics of gray cast iron have just in the past few years been entertained. For example, the truck engine cylinder liner life has been found to be

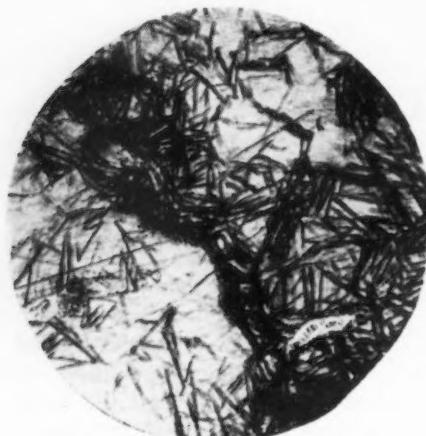


FIG. 1—Typical structure resulting from new heat treatment.

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more than doubled in terms of miles of operation where a high nickel austenitic iron is used in place of plain cast iron. Various heat treatments have been devised which have increased the wearing properties of cast iron.

The heat treating method described in this article is justified primarily by the marked improvement obtainable in physical and wear resistant properties of cast iron. (U. S. Patent No. 2200765.)



FIG. 2—Same sample as in Fig. 1 after six months at room temperature.

The fine work and resulting literature of E. C. Bain, E. S. Davenport and associates, on the "austempering of steel" must be duly credited as the stimulating factor in this work. Interest in the austempering procedure

led to the discovery that by a similar treatment of cast iron (that is an interrupted quench) the same acicular structure or Bainite was evidenced, but in the case of cast iron the austenite was not fully transformed after normal holding time in the hot quenching bath. Furthermore, the austenite was retained at room temperature in-

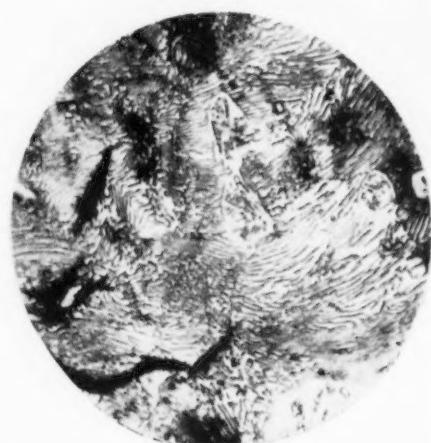


FIG. 3—Micrograph of No. 53 iron as-cast.

definitely until subjected to either cold work or temperatures above the quenching bath temperature. It was also found that unlike steel it made no difference as to the rate of cooling from the bath temperature, the austenite still remaining.

Fig. 1 shows a typical structure resulting from the treatment. The needle like structure is Bainite, the white structure is austenite. Fig. 2 shows the same sample after six months at room temperature.

The details of this heat treatment are as follows:

- (1) Heat to 1550 deg. F., hold at heat 15 min.

- (2) Quench to 510 deg. F., hold at heat 15 min.
- (3) Air cool to room temperature.

The analyses (in per cent) of the irons used in this experimental work are as follows:

	Molybdenum	
	No. 53	No. 54
Total carbon	3.35	3.35
Silicon	1.30-1.40	1.30-1.40
Manganese	0.50-0.80	0.50-0.80
Sulphur	0.13-0.15	0.13-0.15
Phosphorus	0.30 max.	0.30 max.
Nickel	2.00	1.50
Molybdenum		0.50
Chromium		0.50

Fig. 3 shows a photomicrograph of the No. 53 iron as-cast. The Brinell



FIG. 4—No. 53 iron after the interrupted quench treatment.

hardness is 220. Fig. 4 shows the No. 53 iron after the interrupted quench treatment. The Brinell hardness is 388. Figs. 5, 6 and 7 show the structures of No. 53 iron resulting from various methods of cooling from the quenching temperatures.

The rate of cooling from the quenching temperature appears to have little effect on the resulting structure.

The following shows the physical properties resulting from a treatment as outlined above on a molybdenum iron with analysis as given in the table: As Cast—223 Brinell, 47,500 lb. per sq. in. tensile strength, 44 ft.-lb. impact. Heat Treated—341 Brinell, 75,500 lb. per sq. in. tensile strength, 61 ft.-lb. impact strength.

Impact tests were made on a Charpy type machine using an unnotched bar 1.125 in. in diameter broken on 6 in. center.

The heat treated iron is readily ma-

chinable up to 300 Brinell hardness. Because of the small amount of distortion the part may be machined before heat treatment where a hardness above 300 Brinell is required.

This small amount of distortion, as in the case of steel, is one of the advantages of this method. A 2-in. section may be successfully treated but size is not necessarily a limitation

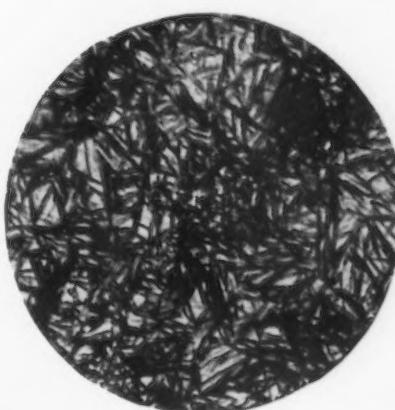


FIG. 5—Standard cooling (air cooled).

where surface wear resistance is desired.

In recognition of the facts that austenite is plastic and also breaks down very rapidly from cold work, the possibilities of the structure for wear resistant surfaces were considered. An accelerated service test was conducted to ascertain the comparative wearing characteristics of cam metal as-cast, hardened and drawn cam metal, and the austenitic cam metal.

Three cams of the same analysis from the same melt were set up in the machine where they would ordinarily be used and the machine was speeded up to double its normal speed.

The first cam, as-cast, had a Brinell of 228 and broke down in 30 min.

The second cam, quenched in oil and drawn to a Brinell of 360, broke down in 17 hr.

The third cam, hot quenched to a Brinell of 360, was run 105 hr. with very little damage at the end of the run.

Fig. 8 shows the structure of the material after the run of 105 hr.

It is felt that the wear resistant properties may be attributed to the combination of the austenite and Bainite. Where austenite is produced in conjunction with martensite and then the austenite is broken down into

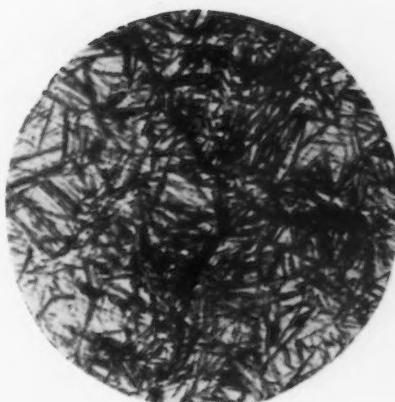


FIG. 6—Cooled in asbestos.

martensite by cold work, the wearing qualities are not so apparent.

The mechanism of inducing wear resistance is furthered by the actual use of the part. As work is done on the surface of the cam or whatever the part may be, the austenite breaks down on the surface resulting in a combination of a martensite and Bainite layer, cushioned underneath by the core of unworked austenite and Bainite. In addition, if there is wear over a period of time as the surface is removed, the austenite breaks down further into the section and hence lengthens the wearing life of the part.

A more quantitative indication of the wearing properties of the hot quenched iron may be obtained from the results of surface endurance tests carried out by Professor Buckingham of M.I.T. In these tests, samples in the form of rolls were mated with a hardened alloy steel roll under various loads and a stress cycle curve developed. The following values of safe loads on the basis of 10,000,000 cycles with no slip, indicates more quanti-

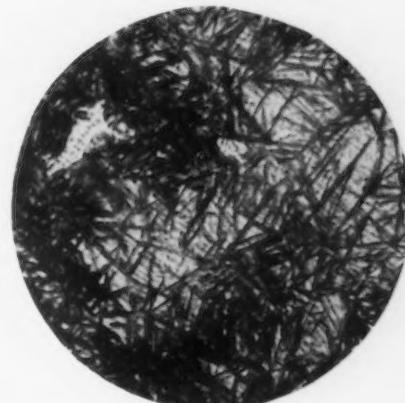


FIG. 7—Cooled in brine.

tatively the same results as the practical cam service test.

Safe Applied Load, in Lb.	Condition of Iron	Brinell Hardness
1000	As cast	230
2000	Oil quenched	300
3000	Hot quenched	300
With 9 per cent slip		
1200	As cast	190
2000	Hot quenched	280

There are many practical applications of this method—cams, gears, wiping plates, clutch disks, cylinder liners, piston rings, planer and lathe ways, bearings, etc.

Most of the above mentioned parts treated by this method are showing satisfactory service in industry at the present writing.

Research in the development of S. curves for cast iron is being conducted

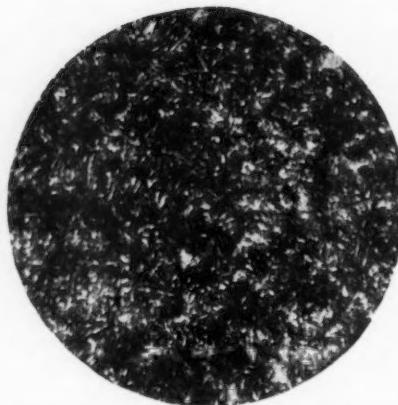


FIG. 8.—Structure after run of 105 hr.

at M.I.T. and the University of Wisconsin. Some work also has been done at the University of Michigan.

Dilatometer work has been carried out by Stanley Rockwell, of Hartford, Conn., and P. R. Kosting, of the Watertown Arsenal. The damping capacity of the hot quenched iron and other work has been studied by the Climax Molybdenum Co. The damping capacity work shows that no appreciable change has taken place in the damping capacity of the cast iron because of the hot quench method.

There is still plenty of research work to be done with cast iron, and as this work progresses it will be found that cast iron is not just pig iron melted in a cupola and poured into a mold but a very fascinating useful material whose real properties have lain dormant because of insufficient interest and work in its behalf.

Improved Black Finish on Steel

AN improvement has recently been developed in the Jetal process for applying a black, corrosion and rust-resistant finish to steel. The process has been changed to a two-bath system which is said to yield a deeper black coating and at the same time, a simpler manipulation and control of the solution.

Two tanks of ordinary iron or steel are required for Jetaling. (No brass or copper fittings should be used.) The first, or A tank, should be kept at 280 deg. to 290 deg. F., and the second, at 305 deg. to 315 deg. F.

Three water rinsing operations are involved, which may be carried out in one or more steel tanks. The water containing the drag-out should be used to replace evaporation losses from both Jetal tanks, but the iron in this drag-out water must be removed before it is returned to the system, either by filtration or by allowing the iron

precipitate to settle and siphoning off the clear water. It is customary to use a final hot rinse to speed up the drying operation, but drying in warm air is also practicable.

All steels, except those high in nickel or chromium, can be colored black by the Jetal process. (Cast iron and some special steels may require deviations from the routine process.) The first step is to remove excess grease or oil from the work in a suitable cleaning solution. Then, dip the work in the alkaline rinse water containing the drag-out. In many cases, such as with hardened steel surfaces, it is advisable to give the cleaned work a short dip in cold dilute acid to secure a deeper black in a shorter time. Heavy scale or rust should be removed in a pickle. The acid dip must be followed with a water rinse before placing the work in the drag-out rinse.

From the drag-out rinse, the wet work is placed immediately in the Jetal A tank and kept there until some coloration is noted. The work is then removed, rinsed in cold water and immediately placed in the Jetal B solution where it remains until the desired depth of black is obtained. This operation is followed by a rinse in the cold drag-out tank, and then with another cold rinse, and finally the hot rinse, to remove the final traces of the Jetal solution. The last rinse may be in hot water alone or in hot water containing 6 per cent or more of a suitable soluble oil in order to obtain dry finished work of excellent appearance.

The time required for the Jetal dips varies with the class of work, but in general, ranges from about 2 min. to 5 min. in each tank, according to Hanson-Van Winkle-Munning Co., Matawan, N. J.

Lithium for Heat Treating Furnace

THE Lithco atmosphere furnace now being merchandised by the Lithco Corp., 175 Fifth Ave., New York, employs a small cartridge type unit for conditioning the furnace atmosphere. The specially developed Lithco compound is said to have the property of neutralizing furnace gases, the result being that alloy and carbon

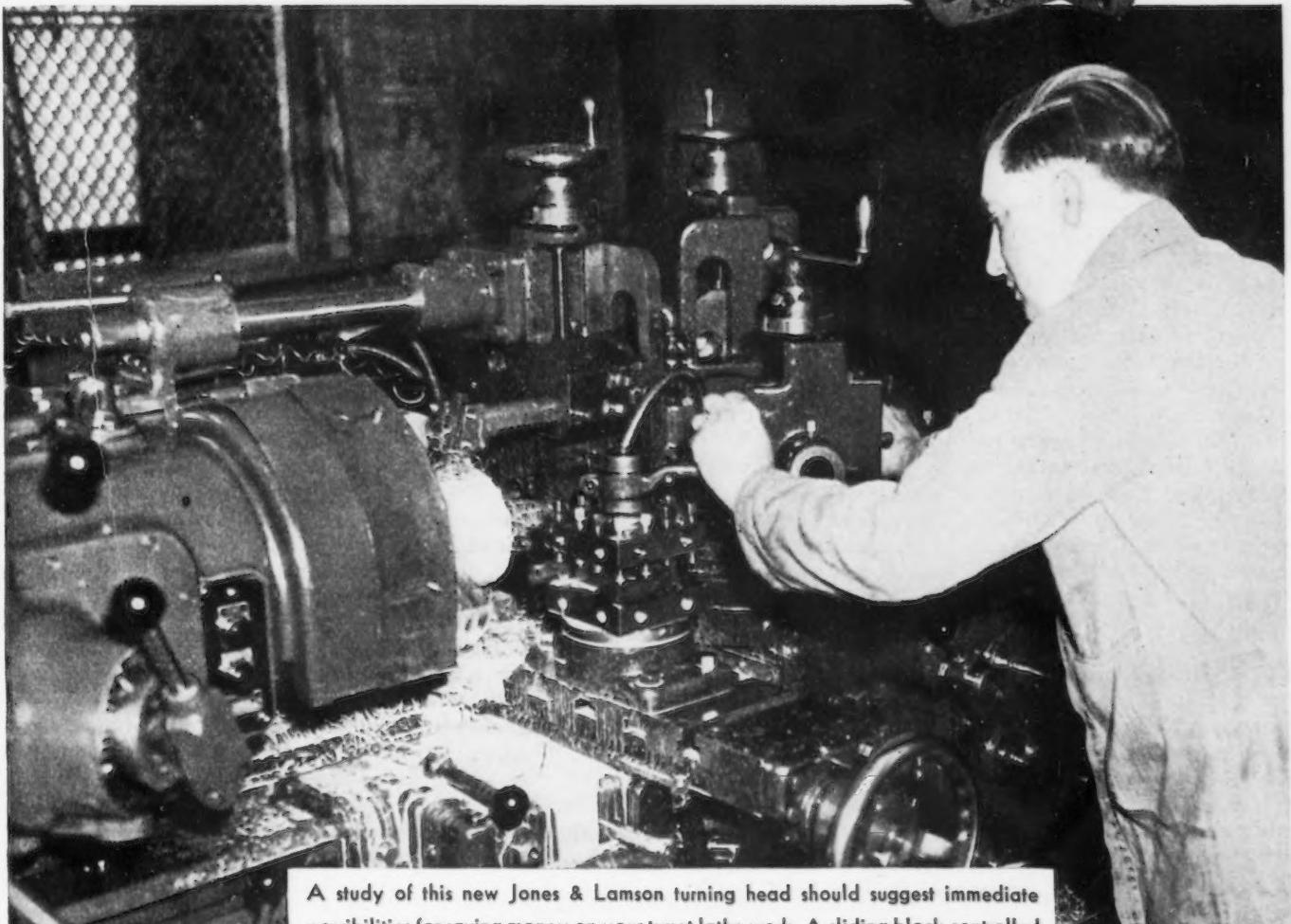
steels can be heated without decarburization, carburization, or scaling. It is further claimed that there is an excess of neutralizing element, and that any oxygen released from water vapors, air, carbon dioxide, carbon monoxide, oxides of nitrogen, absorbed or occluded gases or vapors, or moisture-contaminated hydrogen or

nitrogen is absorbed by this neutralizer. A carrier gas, generated within the furnace, entrains the vapor which evolves continuously from the cartridge refill and bathes the work being heated in this neutralizing atmosphere. The lithium atmosphere is identified by a brilliant scarlet flame; the furnace operation fully automatic.

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SETUP TIME
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**THIS NEW HEAVY DUTY
ADJUSTABLE MULTIPLE TURNING HEAD**



A study of this new Jones & Lamson turning head should suggest immediate possibilities for saving money on your turret lathe work. A sliding block controlled by a graduated handwheel allows instantaneous micromatic tool adjustment that will save 20% to 60% in tool setting time, and a pointer and scale facilitate changes in setup. With a standard cutter holder in the Adjustable Block, it is possible to turn diameters from 1 3/4" up to the capacity of the machine.

We will gladly send more information about this adjustable multiple turning head along with our new Turret Lathe Tool Catalog if you will apply on your firm's letterhead.

Watch these pages for further announcements of new Jones & Lamson Turret Lathe Tools. A few minutes' reading may bring years of extra profit.



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DETROIT—Defense production can be superimposed on normal peacetime business—and must be to strengthen our internal economic defenses, Alfred P. Sloan, Jr., chairman, General Motors Corp., tells stockholders in a special message dealing exclusively with the production aspects of the national defense program. He warned against unnecessarily dropping the output of goods and materials essential to the normal economy of the nation, and said that the sole question regarding prospective production for defense concerns the time element necessary to put new types of products into production.

"Even the most intensive program now contemplated will, during the coming year, absorb only a small percentage of our national production," Mr. Sloan declares. "For example, assuming that the defense program results in expenditures of, say, four billion dollars during the next 12 months, this amount would represent only about 7 per cent of the estimated total outlay by consumers for the peacetime production of commodities turned out by the manufacturing, mining, agricultural and construction industries in a year such as 1937. And we must remember peacetime production adds to our real income; war production adds to our expense."

Tooling Up Is the Big Problem

THE point to be kept in mind is that this 7 per cent of our productive efforts devoted to defense work can be made less burdensome if the other more than 90 per cent is maintained active and at high efficiency. One can be superimposed on the other."

Of the time required to tool up, Mr. Sloan says with authority: "That is the great problem. It is not generally understood just how important this time element is in getting ready to produce on a large scale equipment of a highly complicated technical nature, which previously has been made only in small quantities more or less by hand, or perhaps not at all."

"Mass or quantity production is not a process that can be started at will. . . . The essential element in mass production is the period of preparatory work or 'make ready.' Only after this is completed can mass production, as it is popularly conceived, really begin. Such preparation involves first finding out what is wanted, then designing the product, selecting materials to suit the purpose, testing the samples and correcting their shortcomings, next determining the most desirable methods of manufacture, the development and construction of tools and machinery adequate to the job, laying out the plant for efficient flow of work and

On The Assembly Line
BY W.F. SHERMAN
Detroit Editor

- Automobile industry can engage in defense work without interference with motor car production, says Alfred P. Sloan, Jr.
- Flint is to emphasize industry's readiness for national defense in a four-day Motor Festival.

planning the final production process itself. All of which is required before the first finished products are turned out for use.

"Even in the automobile industry, with its long experience in quantity production and its yearly model change, no substitute has been found for the many months of careful planning and preparation before production can be started on a new design. A year's intensive work is essential.

"In a great many cases the intricate devices that characterize modern warfare require plants that are specifically designed and equipped with special machinery to do the particular job. Where existing plants can be utilized, there is usually required a complete rearrangement and re-coordination of plant fa-

cilities to allow for installation of a vast quantity of new tools and machines, before production can get under way. It can all be done, and there is assurance on every hand that the job will be carried forward most aggressively. But any expectation that miracles can be performed overnight will only lead to confusion in the program and to unnecessary disappointment. The realities must be faced.

"Another factor importantly influencing the production of defense material is the difficulty to be experienced in determining upon the kinds of equipment to be produced and their designs. Especially is this true under current conditions. Military technology appears to be undergoing a rapid change—one might almost say a revolution—so far as types and specifications of particular war implements are concerned. Designs considered adequate yesterday are obsoleted today. If, then, new designs become necessary, further delays are inevitable. With the essential technique of quantity production based upon careful preparation after the approval of a design, even minor changes frequently require a rebuilding of tool equipment and a replanning of the job."

Flint to Have a Motor Festival

HAVING passed at last through the period of sit-downs and labor disturbances, the employers and employees of the automobile industry appear to be seeing eye-to-eye on some vital subjects. Illustrative of the new attitude is the incident that occurred about the time that Chevrolet executives went to Flint on July 12 to celebrate the production of the 1,000,000th 1940 Chevrolet. They found the plant decorated with American flags. Of all sizes, in profusion, they were found in every department. How they got there makes a pertinent story.

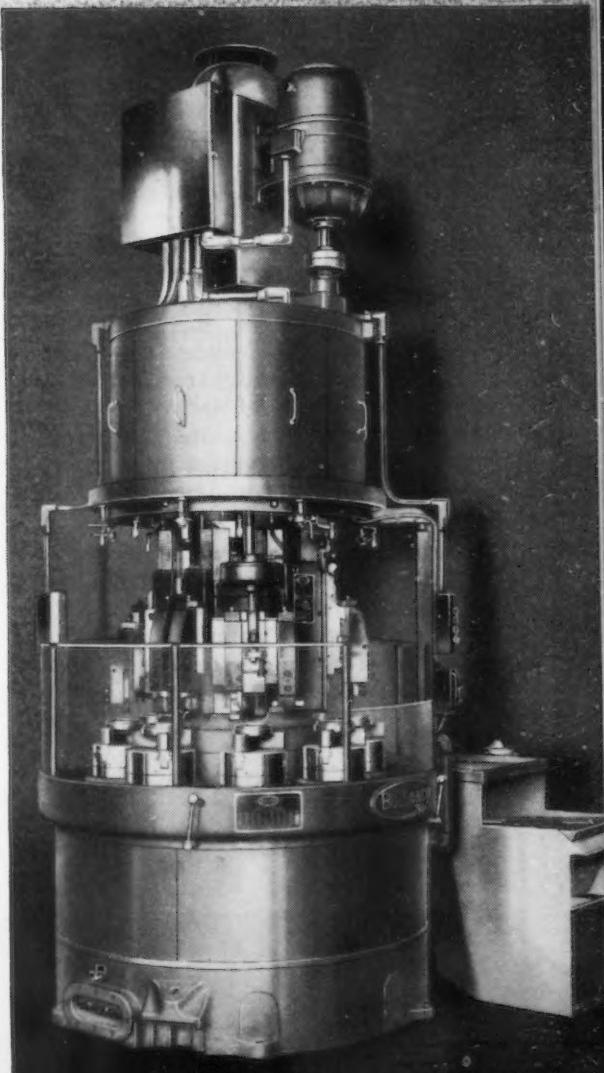


Something to Think About

Machine orders are being filled daily, and other orders date into the year ahead—still they come.

"So what?" you may ask. This—The Mult-Au-Matics and Vertical Turret Lathes which we have been producing and shipping in great quantities are going somewhere—some into your industry, perhaps to your keenest competitors. Eventually the savings realized by manufacturers who use the Mult-Au-Matic Method impose a greater and greater strain on those who are reluctant to embrace better methods—gradually forcing them behind the 8-Ball.

In 60 years we have made many friends throughout industry. We are making new friends. We hope those who are not familiar with Bullard machines, methods, and savings will avail themselves of our suggestion that we get acquainted to the point of having Bullard Engineers study your problems. Do it now—don't let your competitor put you behind the 8-Ball.



THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

BULLARD

ON THE ASSEMBLY LINE

Some weeks ago in Michigan petitions were circulated intended to assure a place on state ballots for the Communist party. A newspaper published a list of names which included, it is said, several Flint Chevrolet workers. Fellow-employees made attempts to oust the signers from the shop, even though some of the signers were in minor union positions, on grievance committees, etc. In a "we'll show them" spirit, workmen bought American flags and put them up in the department. Others followed, and by now some of the plants look as though decorated for a Preparedness Day parade.

In line with this spirit, Flint is staging its four-day Motor Festival, beginning Aug. 1, with a theme which it is hoped will lead a nation-wide demonstration of industrial America's determination to backstop the country's defenses. "Industry Stands Ready for National Defense," is the caption for the celebration. To utilize the theme on a national scale a festival queen will present to the President at the White House a scroll signed by thousands of citizens and workmen who pledge "as workers in American industry to defend and preserve the peace of our country." Most interesting sidelight of all is the fact that both the CIO and AFL are participating with the city's business leaders in staging this annual municipal celebration. It is understood that General Motors, largest employer of labor in the area, virtually predicated its participation in the program on acceptance of the suggestion of workers' participation.

Probably the most noted visitor to the Flint festival will be William S. Knudsen of the National Advisory Defense Commission, now on leave from the presidency of GM. If circumstances do not in-

terfere, Mr. Knudsen will fly to Flint from Washington on Friday of this week.

Incidentally, Mr. Knudsen, who commutes to Detroit each weekend by air, set a record for early-to-work people to shoot at when he arrived in Washington at 7:15 a.m. on Monday of last week. His take-off in an Army transport plane was made at 5 a.m. from Grosse Ile, in the lower Detroit River, near his summer home. Favoring tail winds brought him into Washington before a car reached the airport to take him to his desk.

Output at Low Level

WHILE automobile production is at its lowest level for the year, printers, engravers, artists, photographers and the models who grace the automobile industry's advertising, are the busiest people in Detroit. Much of the printed material and the illustrations to advertise new cars must be delayed until August for its preparation because facts about the new cars are not all available from engineering departments until then, and no photographs can be taken until the initial batch of cars, generally hand-made, is available.

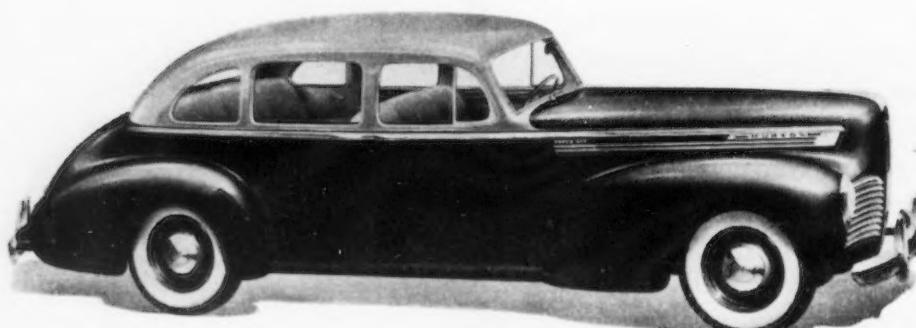
Among the manufacturers getting underway now on 1941 cars are Pontiac, Buick and Olds. In many cases, this week will see the start of production of parts and sub-assemblies. Chevrolet, however, has just wound up its 1940 season (July 26) and will be engaged in changing over equipment until the week of Aug. 5, when delivery of 1941 parts will be started by suppliers.

Every sign now points to a new Ford Six, the car that has been "alive," "killed," and "revived" innumerable times already. As was stated here when the engine with the overhead camshaft was "killed" a short time ago, work was continued at that time on the OMA body, frame and other chassis parts. (OMA is a designation which was applied during the last year to the six-cylinder Ford during its development stages. 1G is the designation now given to the six-cylinder car, which will be produced in 1941.) The assumption that this body and chassis would carry the 60hp. V-8 has fallen by the wayside now, and a conventional six-cylinder engine labeled the 1G seems destined to go into the job. An all-welded chassis frame, incorporating special structural sections and having frame ends butt welded to the main sections, will be used.

Even with Chevrolet and Ford both in production last week, output dropped off to 34,822 cars, and trucks compared with 53,020 in the previous week, according to Ward's Automotive Reports. This is about 12,000 units lower than the 46,329 produced in the corresponding week last year and is the third successive week during which production was lower than the level of a year ago.

Buick's 1941 models will be equipped with a new high-lead babbitt precision bearing which is said to increase bearing life over 200 per cent. The bearings have been developed cooperatively with Moraine Products Division of General Motors at Dayton, and involve the use of powdered metals in manufacture. The new bearing is made to withstand operation under high compression. This is intended to permit Buick's new models to use high octane fuels, which will be available later in the year and thereby improve economy and performance.

CHANGES in body lines and wheelbases are revealed in 1941 Hudson cars which illustrate the sweeping success of two-toned coloring and offer something new in the matching of colors of the interior with the exterior. Upholstery, floor mats, trim, etc. are matched with body color in the full line of cars in standard production at no extra cost even in the lowest priced cars in the line. This is the 1941 Super Six. Hudson has the first 1941 models in production and on display.



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WASHINGTON — A delayed bed-time story was broadcast very early Friday morning, July 19, from the White House. The spirit of Jiminy Cricket was speaking. A mellifluous voice in a fitting climax to the battle of shams at Chicago flowed into an affectedly plaintive cadence as Franklin D. Roosevelt told radio listeners who had bravely resisted slumber that conscience forced him to accept renomination. Only the national emergency could have made him yield. He so wanted to retire to private life, but conscience told him it was his duty to make the noble sacrifice.

In all of this broad land there simply was no other who could carry on, one plainly inferred from Mr. Roosevelt's words and tone. Whatever the country may think are the dangers to its form of government in the doctrine, certain it is Mr. Roosevelt gave the impression that he was under the fantastic delusion that he is indispensable. It is a poor tribute to any man's mind to ascribe such a thought to it. Yet there was no escaping the impression that Mr. Roosevelt sought to project the idea of his indispensability. Most definitely such a mental complex on the part of any one in the powerful position of the Presidency should excite national alarm.

Has Enjoyed Breaking Precedents

THIRD term opponents say Mr. Roosevelt was engaging in dissimulation. Reprehensible though that would be, it would be a lesser evil than the conception of indispensability or an amusing pose as the savior of civilization. Having an almost childish tendency to do something different, Mr. Roosevelt has always enjoyed breaking precedents, just for the sake of being theatrical, as well as for the political value which he thought was to be achieved. On this occasion even Mr. Roosevelt was acutely aware that he was about to embark on a daring precedent-breaking move that could not be made as lightly as he had broken precedents in the past. Quite conceivably, too, he was mindful of the crushing defeat he met in his effort to pack the Supreme Court. Consequently he may have turned to a plea of "conscience" and "duty" as a mask to conceal his desire to perpetuate himself in power. He realized fully that the tradition against a third term has become deep set.

This particular tradition is based on the principles of a republic. It has become so imbedded in the country's history that surely a large section of the people consider that it has the force of law, just as tradition has built up doctrines that have become embodied

Washington
BY L.W. MOFFETT
Washington Editor

Roosevelt preaches the doctrine of the indispensability of one man—himself . . . Should the New Deal be elected, and, if the country can stand the further impact of its economic policies, a further crackdown on business may be expected

fundamentals in the fields of religion, literature, drama and the arts. It is to be earnestly hoped that the country so highly regards the anti-third term tradition because of the implications of dictatorship, that, since he would not voluntarily retire, it will relegate Mr. Roosevelt to private life next January.

Some of the leading lights at the New Deal-controlled convention have voted in the Senate against the third term, condemning violation of the tradition as unpatriotic. Evidently not inflicted with "conscience," however, they shouted down a proposed anti-third term plank. That was not surprising, seeing that, as much as many of the delegates dislike Mr. Roosevelt and the New Deal, it was a matter of selfish expediency.

It was cold practical politics with jobs at stake, or so they thought. Hence they manfully rose above principle. There were notable exceptions. Some still clung to tradition and integrity. Oily praise of them by alarmed New Dealers have failed to bring them back actively into the fold. Some have taken a walk. Others, including the most masterly general in the field of politics, have sheathed their swords and will remain inactive in the tent. Jim Farley's word always rated par or better. He fought long and valiantly for the New Deal, even in the face of the shabby treatment he received at its hands. But he is against the third term and his integrity prevented his continued active support of Mr. Roosevelt.

Wallace a Strong New Dealer

IN forcing an unwilling convention to accept as his running mate, Slow-to-Resign Henry A. Wallace, with millions to hand out to the farmers, Mr. Roosevelt selected a man who, colorless and mystic as he is, is the intellectual superior of the President. Consequently, should the President's primogeniture ascend the throne, Mr. Wallace undoubtedly could expound the New Deal "philosophy" more coherently, if such an economic nondescript as the New Deal can be adjusted to coherence, than has been done by Mr. Roosevelt. The President often finds himself in a sea of confusions, contradictions and general confusion, reflecting the mixed minds of ghost writers and advisers who go to make up the so-called brain trust, whose personnel changes almost with the swift changes of Mr. Roosevelt's unpredictable mind. Consistently, however, Mr. Roosevelt has had at his side Spend-Tax-Elect Harry L. Hopkins, who for some time has been a White House guest. Once the world's greatest spender of public funds, and a noisy business-baiter, Mr.

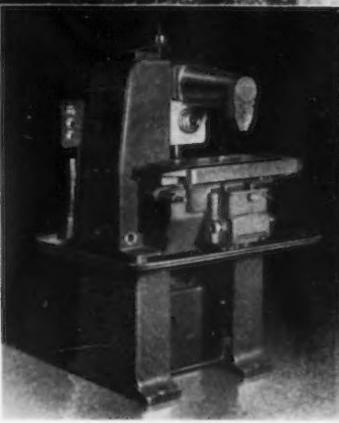


IT TAKES THE 0-8 TO MILL 1500 TYPE AN HOUR *...And Maintain High Quality Requirements*

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WASHINGTON NEWS

Hopkins' political activities as head of the WPA aroused such nationwide revulsion that he was, ironically enough, shunted to the position of Secretary of Commerce. It is a position he occupies in name only. He knows nothing of commerce. It is not surprising that he has succeeded in converting the Department of Commerce into a mausoleum for business.

Though he accepts the salary of a cabinet officer, Hopkins actually doesn't spend enough time on the job as Secretary of Commerce to earn \$1 a year. Still, there are daily publicity blurbs beginning with the stereotyped, "Secretary of Commerce Hopkins said today." They were not interrupted even when Mr. Hopkins and his hatchet men were bungling the job in their Chicago hideaway from another hideaway of directing the Roosevelt third-term campaign, a campaign that was begun four years ago.

Many think that the New Deal already has suffered serious handicaps by the defections in its ranks by those who could no longer stomach the New Deal. Moreover, its pious pretensions of the social and political virtues became so trans-

parently fraudulent by reason of its close association with notorious political machines and personalities, so obviously seen at the Chicago convention, that it can no longer cash in as it has previously on its noble motives.

Should the New Deal be re-elected, however, and if the country could stand further impact of its economic policies, it may be expected that it will crack down on business and industry as never before. A completely socialized government might well be attempted. Regimentation and control much beyond that of the past, as severe as it has been, can be looked for. The New Deal is vengeful, petty and therefore ready to punish and castigate those who do not truckle to it. It knows business is overwhelmingly against it. It knows that any further political success it will have will be in spite of business. It resents the attitude of business and industry.

This is not because of the "economic power" they have. Railing against "economic power," "monopoly," etc., is indulged in largely simply because the New Deal, except for its extreme leftist crackpots, thinks it pays political divi-

dends. Ready enough is the New Deal to blackjack contributions from big, little or any other kind of business, so long as it thinks it can get by the Hatch Act or escape public condemnation. In times when an actual emergency, rather than a trumped-up emergency, prevails, big business has to be called in to do a job, and it is paid glowing but hollow tribute for its services. But because business is against the New Deal and will so vote, the New Deal, if reelected, will strike harder than ever at it, the while asking for national unity.

The New Deal's platform need not be read to tell what the New Deal's business policy will be. Mr. Roosevelt doesn't pay any attention to platforms. He has two, one of the '32 and the other of the '36 vintage. Both are smothered in dust from disuse. He is intolerant of platform pledges or of the opinions of others if they do not fit into his own scheme of things. In Mr. Wallace he has an able counterpart as a disciple of intolerance. It was Mr. Wallace who branded as the greatest legalized theft in history, the decision of the Supreme Court knocking out the AAA. That was the old court. Mr. Wallace turned around, sidestepped the loopholes the court found in the act, and got another which assured continuance of political pap for the farmers.

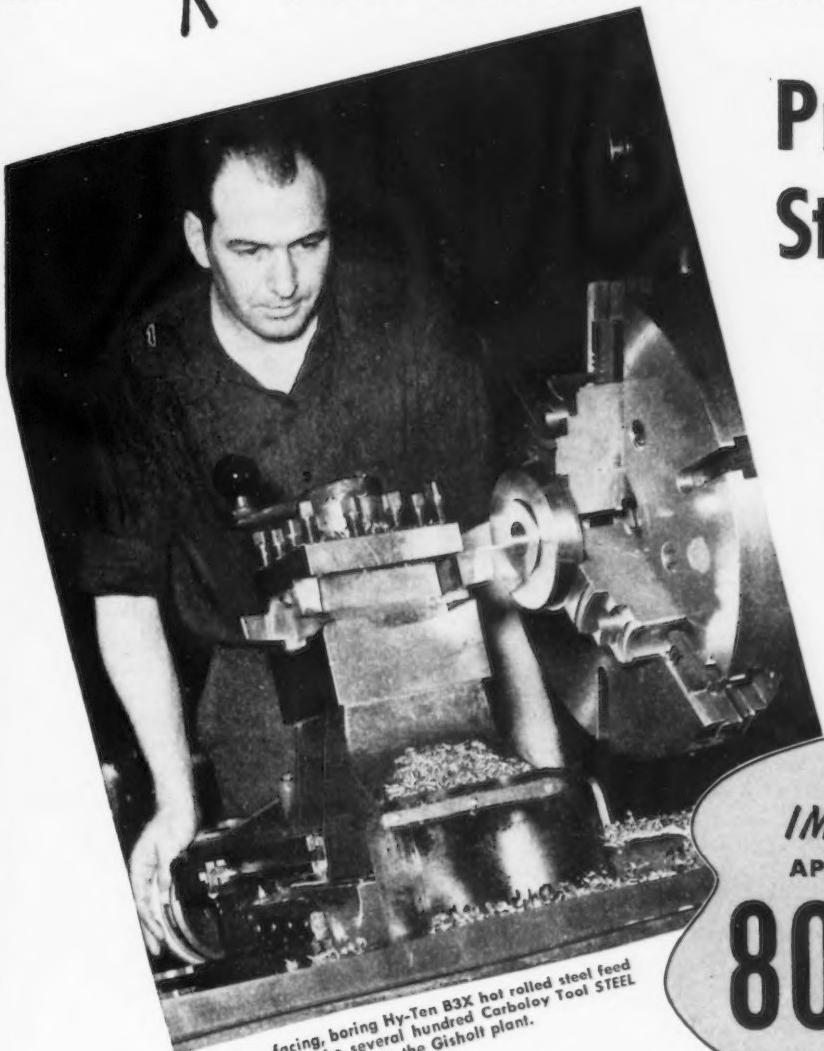
So, if Roosevelt and Wallace are elected in November the country will be under a 100 per cent New Deal government. A House of Representatives of a different political complexion and trace-jumping Democrats in both the House and the Senate might check some additional New Deal experiments legislatively, but powers already in its hands would permit it to go farther afield in its witch hunt against industry, in financial squandering, and in strengthening even more its political machine by increasing the huge civil payroll, already up to the record height of more than 1,000,000, drawing almost \$2,000,000,000 annually from the taxpayers. Then, of course, there is the old political standby, WPA, with its 2,000,000 "employees," many deserving and to be pitied; others not deserving but handy as political pawns, as some of the New Deal leaders know so well from experience, and to which their success in hanging onto the payroll is due.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



BY Simply
A CHANGING TO CARBOLOY TOOLS . . .



Turning, facing, boring Hy-Ten B3X hot rolled steel feed gear—one of the several hundred Carboly Tool STEEL CUTTING applications in the Gisholt plant.

Production **30%**
Stepped Up **30%**

ON MORE THAN 1000
MACHINING JOBS AT

GISHOLT!

IMPORTANT—CARBOLOY TOOL
APPLICATIONS AT GISHOLT ARE

**80% STEEL
CUTTING**

Sharing in common with other leading machine tool builders the abrupt increase in demand that has caused the operating rate of that industry to soar from 52.5% in January 1939 to 92.5% in May 1940, Gisholt Machine Company early sought to more extensively employ cemented carbide tools as one means of increasing machining production.

To meet the problem of applying carbide tools economically on the small-lot, diversified work typical of the machine tool industry (as compared to continuous production applications), Gisholt adopted the following procedure:

1. A carbide "application man" was appointed within

the plant to control all use and maintenance of carbide tools.

2. Ten basic styles of carbide tools were designed for general purpose use on 80% of the work in the shop.
3. Two grades of Carboly—one for steel, one for all other metals—were selected for universal use.
4. A uniform method of carbide tool application was set up and adequate grinding facilities provided.

Result to date has been a 30% average increase in production on more than 1000 jobs to which Carboly tools have been applied.

A 12-page booklet gives complete details. Write for your copy.

CARBOLOY COMPANY, INC., DETROIT, MICHIGAN • Chicago • Cleveland • Newark • Pittsburgh • Philadelphia • Worcester, Mass.

CARBOLOY
REG. U. S. PAT. OFF.



TUNGSTEN CARBIDE—TANTALUM CARBIDE—TITANIUM CARBIDE

FOR CUTTING, DRAWING, SHAPING, EXTRUDING METALS AND NON-METALLICS • FOR REDUCING WEAR ON EQUIPMENT OR PRODUCTS YOU USE OR MAKE

Fatigue Cracks

BY A.H.DIX

Making Assurance Doubly Sure

• • • Lest you fall into the error of the Irishman who asked, "Why should we do anything for posterity? What has posterity ever done for us?" your favorite family journal headlines an item, "Steel's Future Prospects."

Oops, Sorry!

• • • This will bore you, but our passion for accuracy impels us to correct a misstatement made here recently. Your favorite family journal did not, as asserted, move from William St. to its former home at 239 W. 39th St. In between, from 1909 to 1911, 14 Park Place was hallowed. Or don't you care?

Among Those Who Honored Us . . .

• • • Now that we don't have to duck and think fast whenever anyone says "I will call on you at your office," we think it would be a good idea to list the visitors here each week. As a starter we will offer Graham (Baldwin-Southwark) Rohrer, Harold B. (Wallace Barnes) Reid, A. L. (Lincoln Electric) Davis, and Ted (Farrel-Birmingham) Busk.

If Mrs. Knight, our receptionist, sees this, and if she will keep a list, leaving out, of course, that lady with the pop eyes and the gurgle in her voice who has been trying for years to interest us in accident insurance, we will see what we can do.

Fang Replacement Job

• • • Gene Spooner, of our associate publication, *Distribution & Warehousing*, passes along to us this Robins Conveying Belt Co. shipping order, made out by a joker in the name of a Robins man who recently acquired a set of china fangs:

1 Complete Set of Ni-Hard Gnasher Teeth, consisting of:
One Fixed Crusher Set for Fixed Head Section
One Adjustable Crusher Set for Movable Jaw
One Rubber Mounting for Above Crusher Set

Shop Note: Grind fit to permit high-speed operation. Incorporate all later improvements in noise reduction and air conditioning. To be fitted in field. Rush.

Conversation Piece

• • • Anent a recent "Bull of the Woods" cartoon, W. H. (Carnation Co., Oconomowoc, Wis.) Brooks writes, "Did you ever notice the difference in size of men who talk and those who listen?"

Frankly, we haven't. Some little guys we know talk little, and some others think a conversation is a monologue. The same with big guys, and middle-sized. Will Mr. Brooks amplify his point?

That gives us an opportunity to ring in something that caught our eye recently in Somerset Maugham's "The Narrow Corner":

"When a man is fluent it is sometimes because he has said a thing so often that it has lost its mean-

ing, and his speech is most significant when he has to fashion it laboriously from thoughts to which he can give no clear outline."

Poor Correspondent

• • • A smooth conversationalist parades up and down the Pacific Coast, accepting money from IRON AGE subscribers and giving a printed receipt bearing the name, "Western Publishers Service Corporation." Despite the impressiveness of the name, the money never reaches us, and letters sent to the three addresses on the receipt—in San Francisco, Chicago and New York—have come back marked, "Not known here."

We are beginning to wish that people wouldn't pay the "Western Publishers Service Corporation."

Sir!

• • • A gentleman who ran an ad in your favorite family journal under a box number writes that there must be a leak somewhere, as he received letters from other publishers quoting him on the same size ad.

Only one person in the Advertising Department knows the identity of the person or firm who runs an ad under a private box number. The information is kept as confidential as the combination of the office safe. We know, because once we tried to get the name of a "Help Wanted" advertiser for a friend. We didn't get it.

Answers are forwarded unopened. Other publications answer the box number ads in plain envelopes, and, of course, these are forwarded to the advertiser. We can't prevent that. If you run or answer a blind ad in the classified sections, you can depend upon it your identity will remain as unknown as the winner of the fourth next Tuesday at Havre de Grace.

Blurb

• • • Speaking of classified advertising, which is placed wholly on the basis of direct returns, and of which we have more than any other trade paper, this one caught our eye in the July issue of the *Mail Order Journal*:

IT'S FREE, WRITE SYLVIA, 3
Stanton Court, New Bedford, Mass.

Stopper

• • • At Last! A Heart That Won't Stop Beating!—*The Cincinnati Milling Machine Co.—Cincinnati Grinders, Inc.*

Estoppel Notice

• • • The New York Times speaks editorially of "the machine tools situation." Then there are the tanks situation, the Garand rifles production problem, and the airplanes shortage, not to mention the shortage of copies of your favorite families journal Annual Reviews Number.

Puzzles

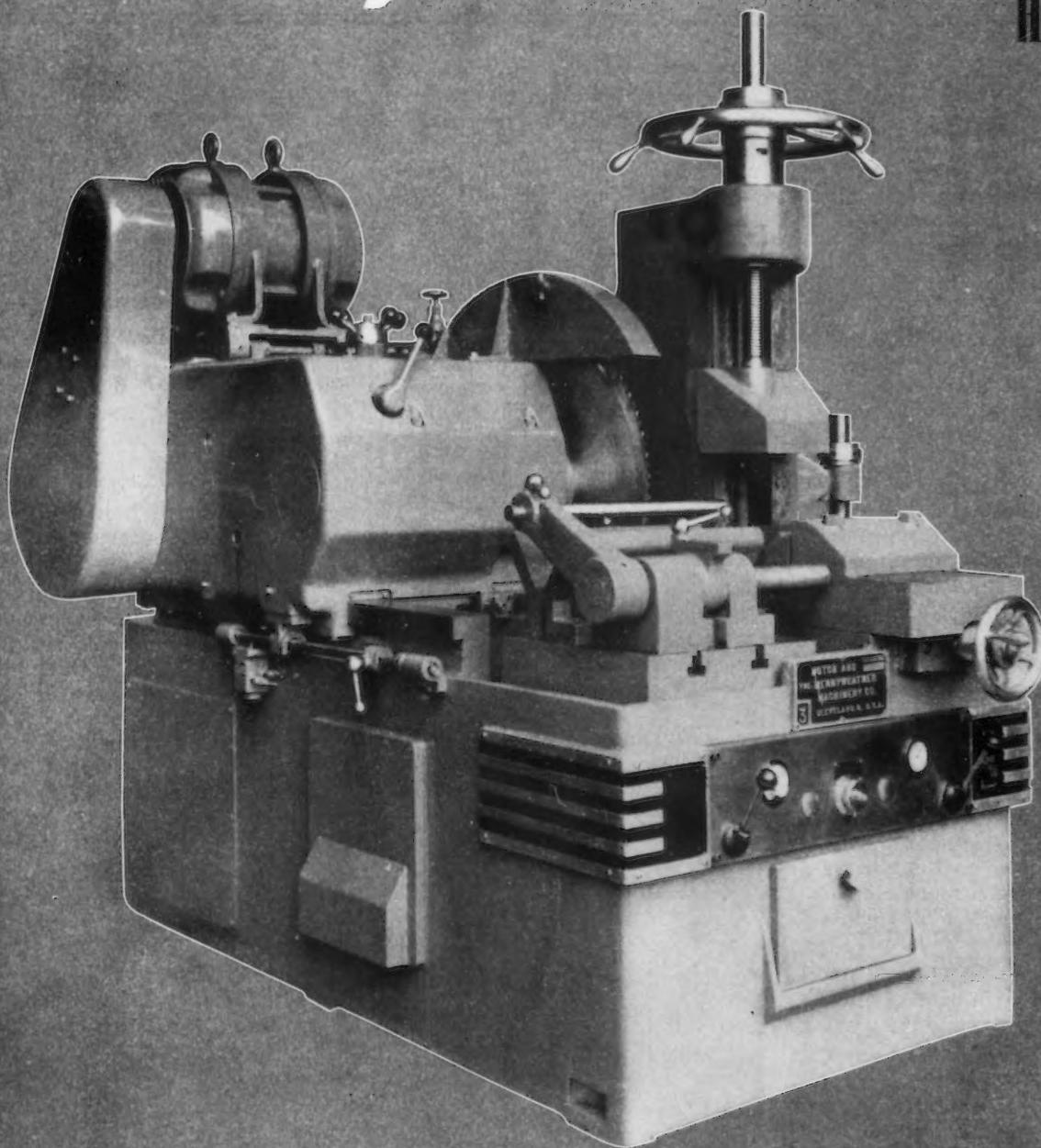
• • • The meat in last week's false balance actually weighed 18 pounds.

If you can get this one before working your way to the bottom of the second rum Collins, the heat hasn't fagged your brain:

A railroad allows a passenger to carry a certain number of pounds of baggage without charge, and charges at a certain rate for all above that amount. Two passengers together have 350 pounds of baggage, and are charged 25c. and 50c. respectively, for the excess. If the baggage had belonged to one of them, he would have been charged \$1.25. How much baggage is one passenger allowed without charge? What rate is charged for the excess baggage? How many pounds did each passenger have?

REQUISITE for REARMAMENT

HYDRAULIC
HEAVY
DUTY
COLD
SAWING
MACHINES



No. 3 MACHINE—Capacity 9 $\frac{5}{8}$ " rounds

To fill a requirement of the Rearmament Program—we are manufacturing a line of Hydraulic Heavy Duty Cold Sawing Machines—equipped with nine speeds—and built in conformity with the most approved machine tool design and workmanship.

THE NOTCH & MERRYWEATHER MACHINERY CO.

CLEVELAND

DETROIT

CINCINNATI

PITTSBURGH

FACTORY: CLEVELAND, OHIO

News of Industry . . .

Tool Engineers' Poll Shows Lack Of Skilled Men

Detroit

• • • A startling condition of available trained manpower in United States industry was revealed here, as first returns from questionnaires to industry began to be tabulated by the American Society of Tool Engineers. According to confidential advices received so far from all types of production industries in all sections of the country, American industry—faced with a tremendous expansion program for defense—does not even have enough skilled help and trained technicians to take care of current demands.

According to Ford R. Lamb, executive secretary of the A.S.T.E., early reports reveal that 34 per cent of industrial organizations are inadequately staffed for even present needs as to tool engineers—the men who are responsible for converting engineering blueprints into production operations.

More than this, he said, 68 per cent of industry is in need of additional tool and die workers, while 67 per cent is searching the country for skilled mechanics.

On top of this condition, the questionnaires reveal that 60 to 70 per cent of industrial plants have plans for expansion of operations in the next few months, requiring still additional tool engineers and skilled workers. Of the companies which are planning immediate expansions, over three-fourths will need additional tool engineers beyond present needs, while 79 per cent must have more tool and die men and 81 per cent will have to find additional skilled mechanics to be able to make the expansion program effective.

"We have not as yet finished our tabulations," Mr. Lamb said. "Questionnaires are still coming in. However, if we had to make a guess at the total number required

for the projected industrial expansion alone, as revealed from questionnaires now at hand, the figures would be somewhere around 60,000 to 70,000 tool engineers and close to half a million skilled mechanics. On the West Coast alone, the aircraft industry will need in the neighborhood of 40,000 additional workers in the next four to six months, as an example, including skilled mechanics and machine operators."

To meet the acute shortage of skilled tool engineers, a program to increase training of such engi-

neers is being launched by the American Society of Tool Engineers, Mr. Lamb said.



Conference Board Finds Skilled Labor Shortage

A lack of skilled labor is the most serious bottleneck in the rearmament program, in the opinion of executives in the industries which will participate in the production of military materials, according to a survey recently made by the Division of Industrial Economics of the Conference Board, 247 Park Avenue, New York.

Although private industry is capable of rapidly increasing production of most products required for speedy rearmament, the replies to the Conference Board's questionnaire revealed that 60 per cent of the reporting industries are already experiencing a skilled labor shortage, or look for one as soon as large defense orders materialize.

In general, however, the executives believed that industry can solve the labor shortage problem through multiple-shift operations, lengthening the work week and through the adoption or extension of training plans. Many companies report that steps have already been taken to meet the shortage.

Sound planning in Washington was called a major factor in expanding production by a number of industrial leaders.

As industry generally has been operating considerably below capacity, it was held that in most cases output could be expanded without large capital expenditures. In certain key defense industries, however, a greatly increased production of new munitions would require considerable capital expenditures for plant expansion. This prospect was reported by executives of the following industries: machine tools, automotive parts, chemicals, electrical equipment, hardware, heavy machinery, steel, metal products and railroad equipment.



CARLETON E. STRYKER, who has been appointed to the staff of the Society of Automotive Engineers, New York, will have responsibility for aircraft activities in the society's national defense program. He comes to the SAE from Bendix Aviation, Ltd., Burbank, Cal.

NEWS OF INDUSTRY

Britain to Get 3000 Airplanes A Month in U. S.

The statement made over the radio last week by Lord Beaverbrook to the effect that a plan is being prepared whereby the United States airplane industry would so increase production that it would be able to supply Great Britain with an additional 3000 planes per month, was confirmed by Arthur B. Purvis, director general of the British Purchasing Commission, and Morris Wilson, Lord Beaverbrook's representative in connection with aircraft production in North America. The commission's statement said:

"This latest development follows discussions which have taken place in the office of Secretary of the Treasury Morgenthau in an effort to synchronize orders and types so as to obtain the best results out of existing manufacturing facilities and out of those in course of creation.

Action has been in progress for a long time in the creation of an aircraft manufacturing potential in the United States, supplementary to that already in existence and being further developed in the United Kingdom. That action has resulted in the creation of a large manufacturing capacity here which is fully engaged on orders for the United Kingdom and the time is now ripe for further increases. The plan referred to by Lord Beaverbrook is the natural development of all the work which has been done hitherto.

By way of comparison, it is pointed out that the plans for aircraft production in the United Kingdom have progressed so rapidly that, as recently revealed by Lord Beaverbrook, the output in July, 1940, is double that achieved in July, 1939. This progressive development of capacity in the United Kingdom is still proceeding and demonstrates the practicability of a corresponding increased effort in the United States.

The position today is that in supplementation of United Kingdom aircraft production there is in existence manufacturing capacity

in the United States for delivering hundreds of planes per month to the United Kingdom. These deliveries will be rapidly augmented as the plants now being built come into production. With the achievement of this progress it is now possible to arrange for still further developments on a large scale which will draw upon the practically unlimited resources of the United States. The objective of an output of 3000 planes per month additional to the productive capacity already assured emphasizes the extent to which those resources can be drawn upon without impairment to the vast program already under way on behalf of the United States."

York Ice Machinery Has Large Government Orders

York, Pa.

• • • Stewart E. Lauer, president of the York Ice Machinery Corp., in an address before 7000 employees and their families picnicking at Hershey Park, Pa., called for unflinching loyalty to the United States government and the ideals of Americanism.

"Our corporation is lending its whole-hearted support," stated Mr. Lauer, "to the government defense program. We are equipping the fighting ships of the Navy, which will protect our shores, with refrigeration and air conditioning amounting to nearly \$1,750,000. We are providing refrigeration for a series of smokeless powder plants, the first of which is at Memphis, Tenn."

Coming Meetings

Sept. 3 to 6—American Society of Mechanical Engineers, fall meeting, Spokane, Wash.

Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.

Oct. 14 to 16—American Gear Manufacturers Association, semi-annual meeting, Skytop, Pa.

Oct. 21 and 22—Associated Machine Tool Dealers of America, annual convention, Dayton, Ohio.

Oct. 21 to 25—National Metal Congress, Cleveland.

Oct. 31 to Nov. 2—Society of Automotive Engineers, national aircraft production meeting and exhibition, Los Angeles.

Canada's Outlay For Shells Now Totals \$57,000,000

Ottawa

Total orders placed for shells and for the creation of shell manufacturing facilities in Canada now amount to some \$57,000,000, according to an announcement made today by C. D. Howe, Minister of Munitions and Supply. Of this sum, approximately \$12,000,000 covers the cost of equipment and extensions to plants in order to create the shell production facilities required.

Six different types of shells are now being manufactured in Canada. With the expanding orders from Great Britain further types of shells will probably be manufactured here shortly.

During the past three months, 48 shell contracts have been placed by the Department for the manufacture of various sizes of high explosive shells and their components. These orders went to 38 firms. Approximately 60 companies are engaged in the manufacture of shells, cases, and their components.

Arrangements have been made with the primary steel producers whereby the major firms in the industry would produce the blanks, that is the small steel billets, which could be distributed for drilling and machining to a wide variety of Canadian firms who have adequate lathe facilities. Thus, the Canadian output of shells could be increased both immediately and substantially.

Semet-Solvay Buys Wilputte Company

• • • Semet-Solvay Co. New York, a subsidiary of Allied Chemical & Dye Corp., has announced the acquisition of the Wilputte Coke Oven Corp. Both companies have been engaged in the building of coke ovens and by-product recovery apparatus and gas generating equipment. Louis Wilputte and his staff will be associated with Semet-Solvay Co.

Delay Over Amortization Plan Holds up Big Airplane Contracts

Washington

More than \$100,000,000 in Army and Navy aircraft contracts, previously reported as having been cleared since June 3 by the National Defense Advisory Commission, have been withheld at the request of aircraft manufacturers pending the passage of the proposed amortization plan to permit the cost of new facilities to be written off over a five-year period.

This disclosure, made by War Department officials, was interpreted as pointing to the likelihood that further contracts will be held in abeyance and to increased agitation for passage of the amortization plan without waiting for Congressional and Treasury Department tax experts to draft an excess profits tax law. A White House announcement on July 10 said that the Administration was entertaining the amortization proposal and planned to incorporate it with the new excess profits tax bill.

The clearance of \$100,000,000 in aircraft contracts since June 3 by the defense commission was announced on July 11 by George J. Mead, head of the commission's aeronautics division (see THE IRON AGE for July 18, page 79). He specifically mentioned the subject of amortization, conceded it had been a serious "stumbling block" prior to the July 10 White House statement, but apparently had reason to believe at that time that members of the aircraft industry would accept the \$100,000,000 in contracts on the basis of assurances contained in the White House announcement without waiting to learn further details of the amortization plan.

It is understood that two methods for computing excess profits and ascertaining the amount to be recaptured by the government are under consideration by Treasury officials in close consultation with experts of the Congressional Joint Committee on Internal Revenue Taxation. One method is understood to involve a computation based on invested capital with profits beyond a certain percent-

age being recaptured by the Treasury.

The other method, used in calculating profits taxes in Great Britain, would use as a yardstick the average profits for each concern during the last few years. Hence, if average profits have been \$100,000 annually for a particular company and these are increased to \$200,000 under the stimulus of defense contracts, the Treasury would take a fixed percentage of the amount earned over and above the average. The new legislation may combine both methods of tax computation for ascertaining tax liability.

It is this excess profits bill to which Administration leaders want to affix their proposed provision for a five-year tax amortization. This provision, a liberalization of the present law which allows a reasonable amount for depreciation and obsolescence but sets no definite period for amortization, will make it possible for most companies to recoup the cost of their investment in new equipment, thereby accelerating the

BOEING AIRCRAFT CO.'S \$2,000,000 plant addition at Seattle, which is being rushed to completion by the Austin Co., to enable the company to start production on a \$23,000,000 order for twin engine attack bombers, will have 600,000 sq. ft. of floor space. Drop hammers, presses and other machinery required to form plane parts will be installed in the area which is seen rising in the background. The plant will be ready some time in August.

defense program. Business interests who were heartened at the amortization announcement nevertheless are awaiting further details of the plan before making definite commitments.

Meanwhile, a new Treasury Department ruling has been issued to permit the amortization of new national defense plants constructed on leased property. Briefly, this means that manufacturers who expand their facilities on leased land as a result of defense orders can write off the cost of expansion on tax returns during the period of the lease, according to Treasury officials. The regulation was described as being applicable even though the lease contains a renewal clause.

Many Workers Recalled To Jobs in Pittsburgh Area

Pittsburgh

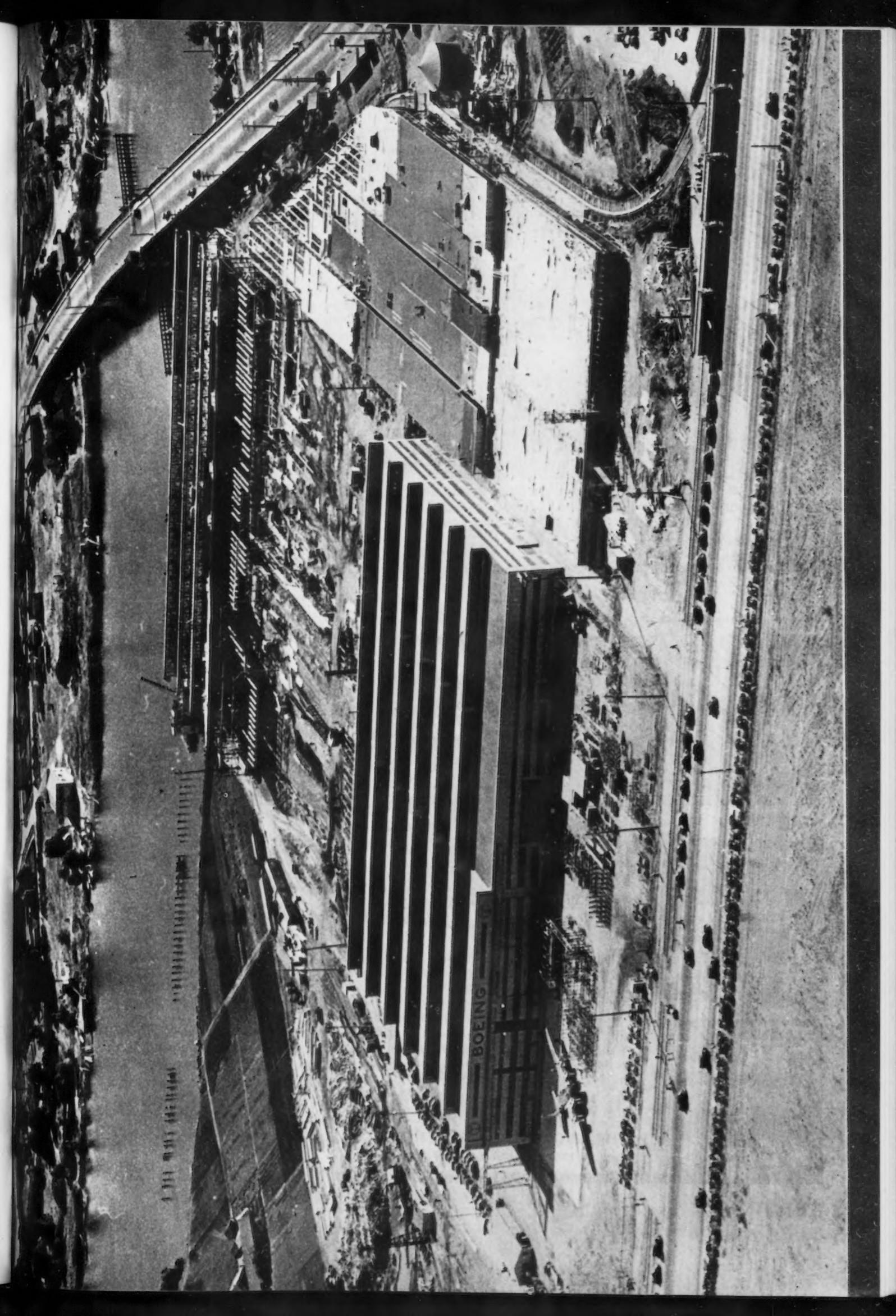
• • • **With close to 30,000 to 35,000** industrial workers having been recalled in the Greater Pittsburgh area within the past few months, the current employment situation which is rapidly reaching 1937 peak levels, presents important differences from the latter period.

The rapid rise in steel and allied activity here in 1937 bore unmistakable signs of speculative action, with the result that a good portion of the recalled workers at that time did not enjoy an extended period of employment since they were separated from the payroll when a decline in business activity set in.

The present status of industrial activity has evolved from a slow steady climb marked by lack of hysteria and speculative urge. The

recalled workers at present face the prospect of a much longer tenure than they had in 1937 because most industrial concerns, even though they should experience a minor drop in the volume of new business in the coming months, would hesitate to dispense with the services of recently hired workers in view of the impending defense program.

Plans are being rushed here for the training of industrial workers with active participation and cooperation by the public schools who are this summer training hundreds of older workers who have become "rusty" in their vocation owing to unemployment. Training of apprentices and high school students is also under way and the cooperative system established here some time ago whereby high school vocational students work alternate two week periods in industry and school, over an extended period, is expanding steadily.



Large Ladles Made Of Welded Steel

The Bethlehem Steel Co. has recently put into use at its Sparrows Point, Md., plant eight large ladles of welded steel construction, each with capacity of 190 tons of molten steel. Smaller ladles of welded construction have been in use for seven years without failure, convincing the company that those of larger capacity can be used with perfect safety. The smaller ladles previously in use have capacity of 135 tons of molten steel.

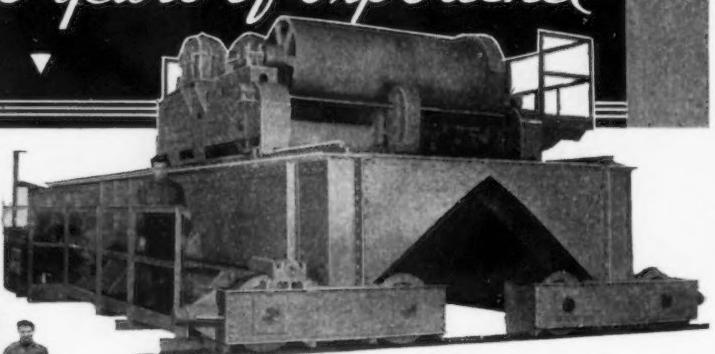
Manufacture of all-welded ladles calls for extreme care in design and fabrication and requires skilled and highly experienced welders, the company says. Adequate equipment for heat treating is essential as the completed ladles must be stress relieved at 1150 to 1250 degrees F.

The weight of the 190-ton ladles, including stopper rigging, is 58,300 lb. Estimated weight of the brick lining is 50,500 lb., making a total weight including the hot metal of 489,600 lb. (assuming 380,800 lb. of metal). They are replacing riveted ladles of conventional construction, of 168 tons capacity, weighing 96,000 lb. without brick lining. This makes a saving of 37,700 lb., or 18.9 tons, which roughly figured offsets the increase in live load of 22 tons of molten steel, and eliminates the necessity for increasing the capacity of cranes, hooks, and run ways.

The new ladles are of elliptical design and have the following dimensions: Largest diameter, 15 ft. 6 $\frac{3}{8}$ in. at top, 12 ft. 4 $\frac{3}{16}$ in. at bottom; smallest diameter, 12 ft. 2 in. at top, 9 ft. 4 $\frac{3}{16}$ in. at bottom; overall depth 12 ft. 9 $\frac{1}{2}$ in.; center to center of lifting hooks, 13 ft. The two trunnions are 13 in. diameter and are made of special forged steel, normalized and annealed for 70,000 lb. per sq.



**80 TONS of CAPACITY
REFLECTING
30 years of experience**



EUCLID CRANES & HOISTS

DESIGNING and building a crane like the one illustrated (one of two 20-ton, 4-motor cranes recently sold), involves many problems that can be safely entrusted only to an organization of long specialized experience and training.

Euclid's experience in crane design covers a third of a century, and we believe justifies your complete confidence.

Ask for catalog and tell us your crane problem. We will work with you.

**THE EUCLID CRANE & HOIST CO.
1361 Chardon Rd., Euclid, Ohio**

EXPERIENCE with welded steel ladles of 135-ton capacity has convinced the Bethlehem Steel Co. that larger ladles constructed by this method can be used with perfect safety, so eight of 190-ton capacity have been installed at the Sparrows Point plant.

in. tensile strength, 40,000 lb. per sq. in. yield point and consistent ductility. The shell plate is 1 $\frac{1}{8}$ in. thick, and is made in two halves, buttwelded together with a vertical, double V-weld.

The ladles were fabricated at Bethlehem's Steelton plant, where furnaces for heat treating work of this size are available. However, as the finished ladles were too large for shipping, it was necessary to make them in two sections, a top section 9 ft. 6 in. high, and a bottom section 3 ft 3 $\frac{1}{4}$ in. high.

Even then it was necessary to go to special routings in shipping the ladles to the Maryland plant.

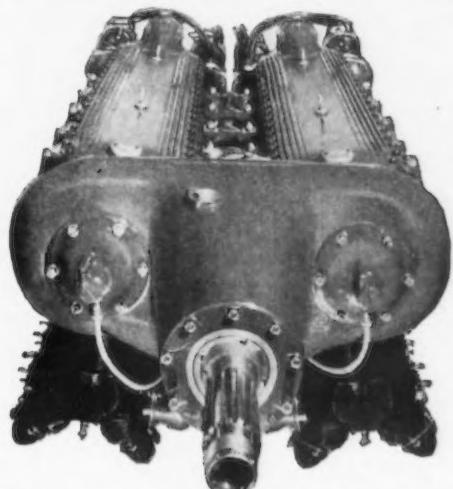
At the point of destination the two sections were riveted together with a horizontal splice band 22 in. wide.

On railways, highways and skyways...

MODERN DESIGNS DEMAND TOUGH METALS

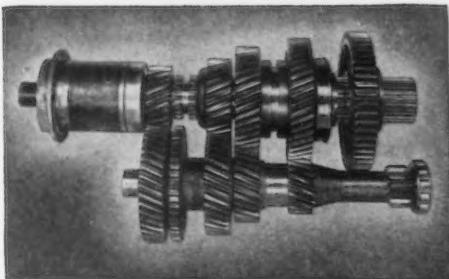


CRANES—Whether you build cranes, planes or truck transmissions, 1940 competition demands efficient, compact designs. Such designs are economically practical when you specify tough, long wearing Nickel alloy steels for stressed units. This modern locomotive crane manufactured by the American Hoist & Derrick Co., St. Paul, Minn., utilizes Nickel steels with tensile strengths up to 115,000 lbs. per square inch for stressed shafting, gears and pinions.



MOTORS—Airplane motors must not fail, so the Menasco Manufacturing Co., Los Angeles, Calif., assure dependability in their "Unitwin" motor by using tough, strong, long-serving Nickel alloy steels for all important parts. The new "Unitwin" consists of two separate in-line engines, generating 325 h.p. apiece, geared to drive a single propeller. The "Unitwin" is used in Vega six place "Starliner" planes.

NICKEL ALLOY STEELS



TRUCK TRANSMISSION PARTS

must withstand rough usage and abuse in service. Therefore, the manufacturers of the heavy duty transmission illustrated here, The Four Wheel Drive Auto Co., Clintonville, Wisconsin, specify Nickel alloy steels to assure safe extra strength and toughness in light weight stressed parts. This transmission is especially designed for heavy duty four-wheel drive service, having a torque capacity in excess of the largest engines available.

→ Heat treatable, readily machinable steels containing Nickel may enable you to simplify design and speed up production. Our suggestions are based upon the practical experience of many plants. For information, without obligation, please address:

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK, N. Y.

**Greater Tonnage
Per Edge of Blade**

**AMERICAN
SHEAR KNIFE CO.**
HOMESTEAD - PENNSYLVANIA

Letters On The Willkie Editorial

• • • My compliments to THE IRON AGE, and personally to Mr. Van Deventer, my favorite editor. I would like to have 100 copies of the July 11 editorial. It is in the front window of my storeroom and is attracting a great deal of attention. As usual, Mr. Van Deventer has hit the nail on the head.

—Willis Sutson, Chicago.

• • • Would it be possible to secure 500 copies of the "Help Wanted!" editorial? If so, please send and bill us.

—E. J. Creighton, Mgr., Structural Dept., Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

• • • Please consider this an order for 1000 reprints of the July 11 editorial.

—Henry Booth, vice-president, Shawinigan Products Corp., New York

• • • I would like to get 50 copies of the Willkie editorial. Kindly send and bill.

—Edwin M. Lavino, president, E. J. Lavino & Co., Philadelphia

• • • Please favor me with as many copies of the "Help Wanted" editorial as the enclosed \$1 will pay for. Certainly a pleasant idea and a beautiful photograph.

—W. H. Brooks, Carnation Co., Oconomowoc, Wis.

• • • Your July 11 editorial is excellent. I would like to order 50 copies.

—George E. Routh, Bethlehem, Pa.

• • • We would appreciate receiving 200 reprints of the Willkie editorial. Please accept this as your authority to fill our order.

—P. M. Offill, vice-president, Amsler-Morton Co., Pittsburgh

• • • We have had several inquiries in our framing department for copies of the Willkie picture which was in your last issue. Would it be possible to obtain about one-half dozen copies.

—Francis Hendricks Co., Inc., Syracuse, N. Y.

• • • We would like very much to receive 25 copies of the July 11 editorial. If this quantity is not available, will you please send us as many copies as you can.

—G. Russell, Cimatoil Co., Dayton, Ohio

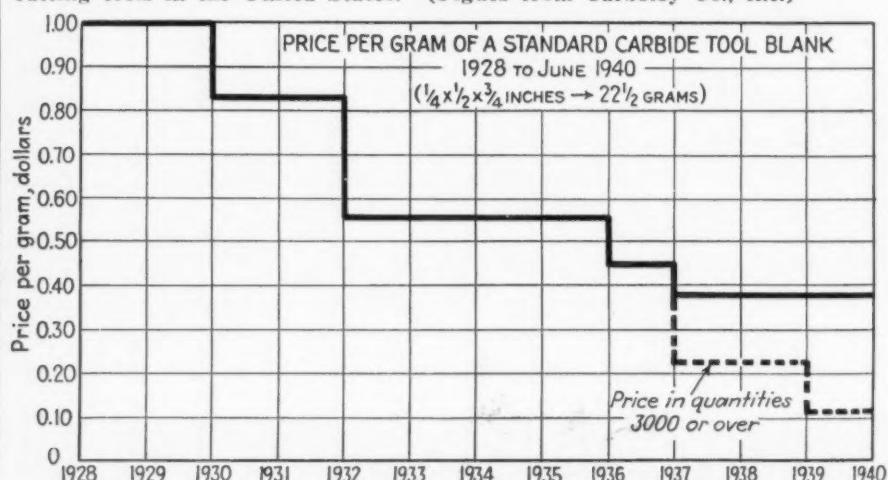
• • • On page 27 of your July 11 issue you ran a picture of Wendell Willkie under the heading "Help Wanted!" If reprints of this page are available I think it would be a real service for you to mail them to as many people as possible.

—Delmar G. Starkey, executive secretary, Columbus Chamber of Commerce, Columbus

• • • I am a little disappointed not to get some copies of "Help Wanted!" I wanted 100 copies. I think you have hit the nail on the head. I am certainly proud of you. I only regret that I did not think of it.

—H. B. Crouse, president, Crouse-Hinds Co., Syracuse, N. Y.

• • • As a result of wider use—particularly for steel cutting—and increased production of cemented carbides over the past 10 years, the cost of such tools has been greatly reduced. Since 1930 the price of a typical standard blank of the metal has dropped over 60 per cent (from \$1 to 38.3c per gram), while minimum prices based on large quantities have declined to almost 1/10 of the 1930 schedule, indicating potential economies available as use of carbides increases. Large increases are anticipated in connection with the current armament program. There are at present some 80 producers of carbonyl cutting tools in the United States. (Figures from Carboloy Co., Inc.)



U. S. Civil Service Seeks Metallurgists

• • • In connection with the national defense program the United States Civil Service Commission is endeavoring to secure well qualified metallurgists and metallurgical engineers for employment in the Federal Government. Examinations have been announced to fill these positions, covering six grades, with salaries ranging from \$2,000 for the junior grades to \$5,600 for the principal grades. The salaries are subject to a retirement deduction of 3½ per cent.

Applications must be filed with the commission's Washington office not later than Aug. 22, if received from states east of Colorado, and not later than Aug. 26, 1940, if received from Colorado and states westward.

Massachusetts Manufacturers Report Orders Rising

Boston

• • • The Associated Industries of Massachusetts reports orders received by Massachusetts manufacturers in June were 15 per cent larger than for May, this year, and 28.1 per cent greater than in June, 1939. Orders taken by the metal trades in June were 51.1 per cent larger than in the like 1939 month.

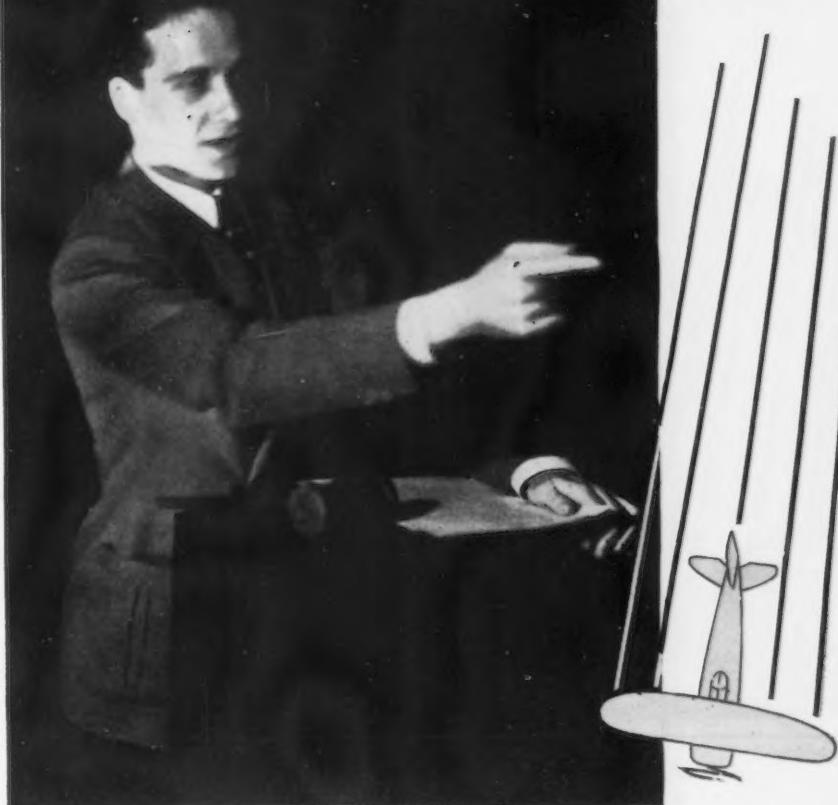
Massachusetts manufacturers in May, this year, booked 10.4 per cent more business than they did in April. The gain in bookings by the metal trade in May over April was 15.9 per cent.

Power Shovel Dipper Sales Show Increase

Evidence of increased construction activity is shown in the sharp sales increases announced by the Pettibone Mulliken Corp., Chicago, one of the largest suppliers of welded dippers for power shovels. During the first five months of 1940 this company sold more welded dippers than in the entire year of 1939.

The company feels that such sales expansion is due not only to greater building activity, but also to the extended use of welded construction for power shovel dippers.

"Give Us More and BETTER PLANES"



HERE IS ONE OF THE ANSWERS

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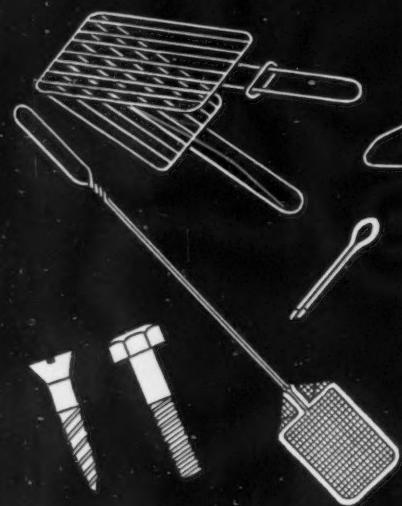
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Railroad Requirements Exaggerated, Says Gormley

Duluth, Minn.

• • • Assuming that the national defense program will call for at least 10,000,000 tons of steel over a two-year period, and that with raw materials and finished products about 1,013,000 carloads by rail will be required to move traffic, Mr. J. Gormley, executive assistant of the Association of American Railroads, told the Northwest Shippers' Advisory Board that the railroads are equipped to meet national defense activities.

He assailed what he said was exaggeration of the equipment requirements of the railroads and the transportation needs that may arise from the preparedness program. He declared that "one of our difficulties now is the hysteria on the part of some people as to the magnitude of the transportation load in connection with the preparedness program." The public, Mr. Gormley said, should not be influenced by "the conclusions of the astronomical statisticians." He expressed the opinion that "protection from well-meaning but unknowing friends is one of the greatest needs of the railroads."

Mr. Gormley placed the maximum traffic resulting from the national defense program at an average of 50,792 carloads per week, or less than 8 per cent of the average weekly carloadings in 1939. This estimate, he stated, is based on information obtainable at the present time.

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Die Casting Industry to Have Minimum Wage Hearing

Washington

• • • The Public Contracts Board will hold a hearing in room 3229, Department of Labor Building, Washington, at 10 a.m. Thursday, Aug. 8, to take testimony upon which findings of fact will be made to assist the Secretary of Labor in determining, pursuant to the Public Contracts Act, the prevailing minimum wage in the die casting manufacturing industry, which does not include the manufacture of die castings when manufactured for use as part of another product by the manufacturer of such other products.

Foundry Research Project For Battelle Institute

Clyde E. Williams, director, Battelle Memorial Institute, Columbus, Ohio, has announced that the recently organized Gray Iron Research Institute is to conduct a program of foundry research at the Battelle institute. As a first part of the program it is planned to conduct studies of the fundamental principles of the cupola melting of gray cast iron, using the combined laboratory facilities of the fuels and metallurgical laboratories as well as the experimental foundry at Battelle. It is expected that these investigations will provide the groundwork for more accurate control of metal quality and composition.

The experimental program at Battelle will be under the direction of Dr. C. H. Lorig, supervising metallurgist, and R. A. Sherman, head of the fuels division.

To Study Army's Needs In Railroad Equipment Washington

Creation of a military transportation section to maintain close liaison between the military forces and the rail systems of the country was announced last week by the Association of American Railroads. Arthur H. Gass, former St. Louis district manager of the association's car service division and more recently attached to the French Purchasing Commission, was named manager of the new section effective August 1.

Set up as a unit of the car service division, the military transportation section, in addition to cooperating in working out routings and schedules for all troop movements, will gather all necessary information regarding freight and passenger equipment needed by the Army.

Britain Using 45% More Of Home Mined Iron Ore London

• • • Consumption of home produced iron ore in British blast furnaces is 45 per cent higher than in normal times before the war. The recovery of scrap from domestic sources has recently set up an all-time record.

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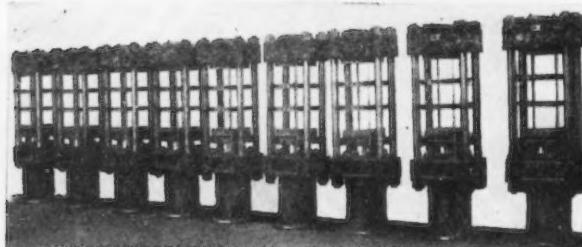
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**Southern Business to Give
Guardsmen Leave With Pay**
Birmingham

Gov. Frank M. Dixon's appeal to industrialists and business heads to grant guardsmen-employees three weeks with pay to permit their participation in summer maneuvers has brought pledges of hearty support.

Companies agreeing to pay these employees for the three-week training period without loss of pay include the Tennessee Coal, Iron & Railroad Co., Woodward Iron Co., Chicago Bridge & Iron Co., Hardie-Tynes Mfg. Co., the Texas Co., Alabama Natural Gas Co., Armour Fertilizer Works, Alabama Power Co., Birmingham Electric Co., Avondale Mills and Remington Rand, Inc.

Alabama national guardsmen will drill in the Sabine River area of Louisiana Aug. 4 to 24.

**Haynes Stellite
Builds Plant Addition**

• • • Haynes Stellite Co., Unit of Union Carbide & Carbon Corp., is expanding its manufacturing facilities at its plant in Kokomo, Ind., by the addition of a new 75 x 132-ft. factory building, a one-story structure of steel and brick with concrete floor and wide monitor top. It is expected that the building will be ready for use in August. The new building will house machinery to be used in the manufacture of Haynes Stellite alloy products: metal-cutting tools, hard-facing rods, and special castings for resisting abrasion, corrosion, and heat.

**U. S. Industrial Training
To Be Started in South
Birmingham**

Homer H. Haisten, an apprentice coordinator for the Tennessee Coal, Iron & Railroad Co., has been appointed superintendent of the federal government's model industrial training center here. The building owned by the American Radiator & Standard Corp. on 29th Street, North, has been leased for the project. The building contains 160,000 sq. ft. of floor space.

Allege Communists Try To Disrupt Defense Program

New Kensington, Pa.

Aluminum workers here last week blamed the Communist Party of western Pennsylvania with an attempt to disrupt the government's national defense program. The communists, it is charged, distributed leaflets to workers which attacked union negotiators for accepting a company proposed 2c. an hr. wage boost in place of the 10c. an hr. increase for which they had asked. The 2c. an hr. proposal was voted on by union workmen in five Aluminum Co. plants and accepted with the New Kensington employees adopting it by unanimous vote.

The recent wage dispute and final negotiation which was arrived at without a strike, was brought about through the combined efforts of the company, the union, and Sidney Hillman, CIO official, acting in his capacity as member of the National Defense Advisory Committee.

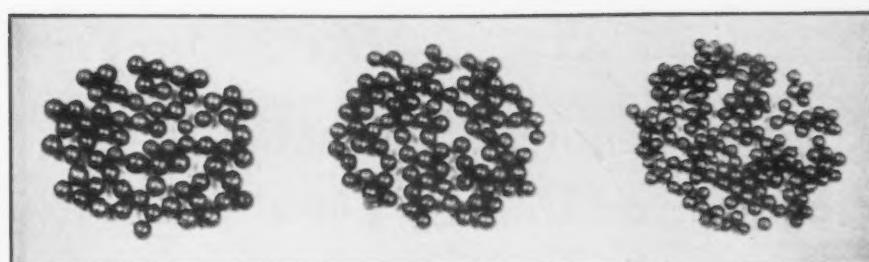
Manhattan Rubber Installs Large Tank Vulcanizer

• • • A large vulcanizer, measuring 15 ft. in diameter, has been installed at the factory of the Manhattan Rubber Mfg. division at Passaic, N. J., for vulcanizing rubber lined tanks and other equipment for resistance against corrosive liquids and to prevent contamination to the process substances, such as plating baths. This huge vulcanizer will enable the company to handle industrial equipment of greater magnitude for rubber lining of almost every description.

Registration of Aliens To Be Begun Aug. 27

Washington

• • • As part of the national defense program, a nationwide registration of aliens will be conducted from Aug. 27 through Dec. 1940, by the Immigration and Naturalization Service of the Department of Justice. Registration will take place in the postoffices of the nation. It is expected that more than 3,500,000 aliens will be registered during this period.



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A shot or grit that will blast fast with a clean finish.

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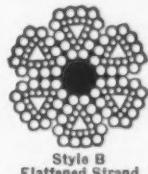
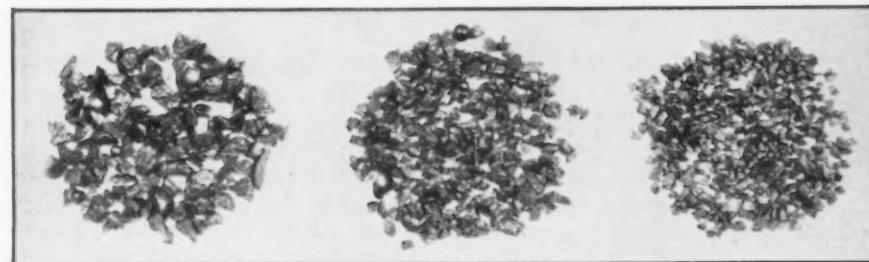
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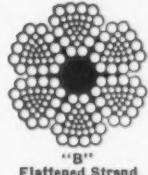
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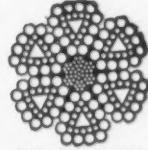
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Style B
Flattened Strand



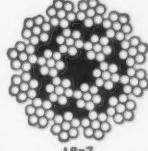
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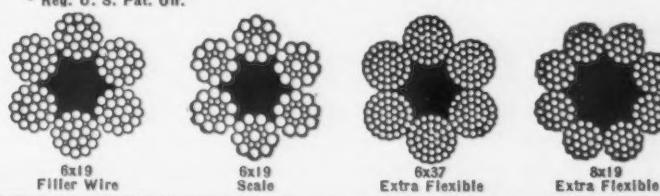
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Knudsen Reports "Substantial Progress" on Defense Plans

Washington

• • • In his second progress report to be released since July 15, William S. Knudsen, head of the production division of the National Defense Advisory Commission, last Friday reported "substantial progress" in coordinating industrial resources, and minimized reports that the question of amortization continues to be a stumbling block under the defense program.

Mr. Knudsen, meeting the press in one of the commission's imposing air cooled offices of the Federal Reserve Board Building, answered queries for almost an hour, summoned an aide for additional data when more detailed information was sought, and denied that he had found working for the Government was any different than getting things done for General Motors. He said he had not found "red tape" to be a handicap since he came to Washington, that he was receiving full cooperation from all Government officials, and that he had found the Army and Navy have a well-planned program laid out and know exactly what they want.

After giving a few details concerning the status of programs involving tanks, aircraft and shipbuilding facilities, the General Motors executive expressed the belief that he can sell business on going ahead with contracts pending Congressional enactment of an amortization plan designed to permit writing off defense expansion costs over a five-year period.

Mr. Knudsen conceded that the inability of manufacturers to write off costs over a short period had been a tremendous drawback under the defense program but insisted that the commission would have "clear sailing" after the amortization problem is finally disposed of. It was his forecast that Congress will lose no time in enacting the amortization plan which, according to present Administration plans, will be a part of the new excess profits tax bill being whipped into shape by Treasury Department and Congressional tax experts. He said he could see no reason why there should be any hesitation on the part

of industry to go ahead with defense expansion plans on the basis of these assurances.

Satisfied after seven weeks as head of the industrial production division that "we can do the job mapped out," Mr. Knudsen set forth these developments on various phases of the program:

Tanks—Months of effort will have to be expended on design alone, but tank designs are well advanced. Contracts already placed for the lighter type, include an initial order with American Car & Foundry Co. for 627. Heavier tanks are being redesigned in the light of European experience. Design of the light tanks requires 2400 individual drawings; for the 155 mm. gun carriage, 1000 separate drawings, an additional 500 for the recoil mechanism; tank guns of 75 mm. 300 drawings, their panoramic sight, 160.

Airplanes and Engines—Estimates on required capacities for planes and engines have been completed but are confidential. The industry is expected to be able to meet the goal of 25,000 complete aircraft, including engines and armor, by July 1, 1942, without any threatened interference with British orders. Existing aircraft production is 900 to 1000 planes per month with August production of 895 units divided roughly as follows: For the United States, 396; for Great Britain, 236; for other foreign countries including South American, 84; commercial planes for this country, 174; unclassified, 5.

Automobile industry's part in aircraft program—Aircraft orders are not being placed with automobile concerns because War Department plans, calling for conversion of plants for aircraft production, are based on war-time conditions. Until war-time conditions arise, the defense commission takes the view that expansion of existing aircraft facilities and the construction of new aircraft plants offer the preferred route rather than to disrupt peace-time schedules of automobile plants.

Negotiations for the construction

of 9000 Rolls-Royce engines by Packard Motor Co. are still under way but the question of amortization has not been a factor in delaying final settlement. Packard officials conferred with representatives of the Reconstruction Finance Corp. on July 26. (In what was described as the first substantial loan to industry under the defense program, the RFC announced late last week that it had approved a loan of \$92,000,000 to the Wright Aeronautical Corp., for financing a new engine plant in Hamilton County, Ohio, designed to produce 12,000 aircraft motors a year.)

British Aircraft Purchasing Program—The British Purchasing Commission has requested the defense commission to prepare cost estimates on a projected 3000-planes-a-month program. Tentative estimates showed that 38 plants, requiring from 6 to 11 months for construction, will be necessary and that the goal of 3000 planes monthly could not be reached until mid-1942. The defense commission will base its estimates on undisclosed types of two and four-engine planes in both combat and training categories.

Light Ordnance and Explosives—Under contracts signed with the du Pont company, a Government-owned powder plant, to have a production capacity of 200,000 lb. per day will be erected at Charlestown, Ind. Contrasted with an elapse of seven months before a contract was awarded for powder plant construction after the United States declaration of war in 1917, the Government-owned du Pont plant under present plans will be completed and operating in 10 months. Well advanced, negotiations for a shell-loading plant are expected to lead to a signed contract shortly. No serious problem exists in production of small arms and ammunition and assurances have been received that at least 500 new Garand rifles will be produced daily in one arsenal by Oct. 1 and that production there will be doubled by early spring.

Shipbuilding—Working closely with the Navy Department on construction capacity under the 70 per cent naval expansion program, the commission is making detailed studies on necessary shipbuilding facilities, has already drawn up plans for expanding facilities in five yards on the Pacific and Gulf

Coasts. Allis-Chalmers, General Electric and Westinghouse companies have been asked to study the problem of turbine requirements under the enlarged shipbuilding program. The machine tool industry has reported to the commission that planers and millers for working armor plate under the naval program—a step expected to prevent what might have been a serious delay in naval construction—will be made available on time.

Construction—A survey undertaken to determine War and Navy Department requirements in the immediate future is expected to show definitely the amount of construction contemplated by these two departments in connection with the defense program.

President Roosevelt, discussing question of amortization at a press conference last Friday, reiterated his belief that proposals to repeal existing profits limitations in deference to an excess profits tax, and to shorten the amortization period to five years, would have to be combined with the excess profits tax bill as a means of protecting Treasury revenue and preventing any profiteering.

Industrial Developments In New England

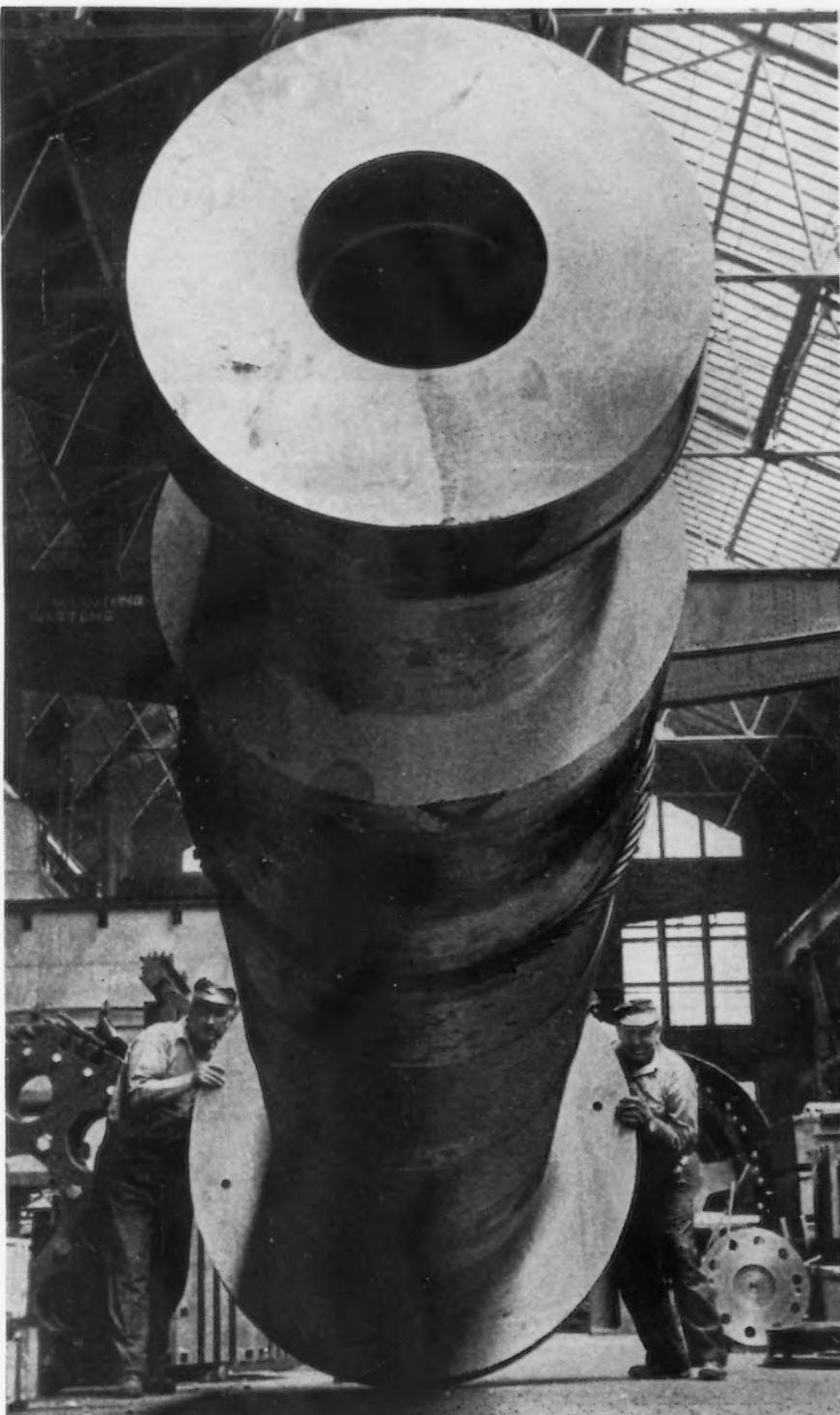
Boston

• • • New Haven Railroad is to operate a single track from Braintree to Plymouth, Mass., as against two at present, making it a less important factor in the steel rail market.

Boston & Maine Railroad repair shops at Billerica, Mass., and Concord, N. H., employing 1065 workmen; Maine Central Railroad car shops at Waterville, Me., employing 400, will forego the usual August shutdown this year, and remain in operation.

Indian Motorcycle Co., Springfield, Mass., has received an order for 800 machines with a cash value of close to \$250,000 from the Canadian government.

Gilbert & Barker Co., West Springfield, Mass., has received an order from the Hartford (Conn.) ordnance district for 37 mm. guns to cost \$441,000. The company now has nearly \$1,500,-



THIS IS NOT A CANNON, though it looks like one. It is 130,000-lb. shaft, which will be used by General Electric Co. in building one of the 75,000 hp. generators for the \$51,000,000 Bonneville dam power project.

000 of preparedness orders on its books.

Bath Iron works, Bath, Me., has in process of construction or contracted for 13 fast fighting ships for the Navy, and four 420 ft.

freighters for the American Export Lines. These 17 vessels represent an aggregate contract value of \$75,000,000. The company expects to shortly obtain contracts for six additional destroyers.



ONE OF THE most beautiful highway bridges of recent construction is the new Jamestown, R. I., bridge which spans the west passage of Narragansett Bay, thereby giving motorists a 50-mile short-cut along the shore route between New York and Cape Cod. The bridge, which was opened to traffic on July 20, was fabricated and erected by Harris Structural Steel Co., New York.

Export-Import Bank To Send Brazil \$10,000,000 For New Steel Plant

Washington

• • • At the Export-Import Bank it was stated that it had agreed to grant the Brazilian government a credit of \$10,000,000 for the purchase of equipment in the United States for a proposed steel plant in that country. The credit was allowed, it was stated, on the condition that Brazil has a "rational plan" for the construction, equipment and operation of a steel plant. The credit, it was stated, would be guaranteed by the Bank of Brazil.

So far as the Export-Import Bank is concerned, it was pointed out, it has no knowledge regarding details for the plant organization, or even whether they have reached the blueprint stage. The implication was given that negotiations between the two governments therefore are only in the preliminary stage.

Confirmation was given to published reports that a commission appointed by President Getulio Vargas is en route to the United States. It will confer with Export-Import Bank officials, study steel production processes, talk to contractors regarding erection of the plant and to manufacturers of furnace and mill equipment, and also discuss the matter of obtaining technical aid to operate the plant and instruct Brazilian workers. The commission consists of Guilherme Guinle, wealthy industrialist, engineer and banker; Lieut. Col. Maceo Soares, Army Engineer Corps and Ary Torres, civil engineer.

It is reported that the commission will return to Brazil and report to President Vargas after which orders would be placed, assuming that the Brazilian plan is acceptable to the Export-Import Bank. It is also reported that the commission will place orders for 200 miles of railroad track to connect the iron mines with the mill, material to increase the facilities at the Rio de Janeiro port and railroad equipment to increase the coal-hauling capacity from the coal mines at Santa Catharina to the seaboard.

A dispatch from Rio de Janeiro published in the *New York Times* of July 25 said that the corporation will be organized in Brazil and capitalized at 500,000 contos (approximately \$27,500,000), guaranteed by the Federal Treasury. The capital will be divided into debentures and preferred and common shares which will be offered to the public.

Plans for building and operating the plant, designed to free Brazil from dependence on imported steel, apparently are the same as those contemplated when the Brazilian government publicized a proposal by which the United States Steel Corp., with the aid of the Brazilian government, was to establish a \$30,000,000 plant in Brazil, utilizing iron ore from the state of Minas Geraes. At that time the Brazilian government contemplated a \$10,000,000 credit from the Export-Import Bank. Subsequently the Brazilian government-United States Steel

Corp. negotiations were abandoned.

Since Brazil proposes to use her own raw materials, including coal and iron ore, it is evident the proposed steel plant would be completely integrated, with coke ovens, blast furnaces, steel works and finishing mills. The new York *Times* dispatch says that it is expected that the plant will be ready within three years, about 20 miles from Rio de Janeiro, accessible to both deep sea water and railroads. The capacity was said to be estimated at 300,000 tons.

In conclusion the New York *Times* dispatch says:

"By solving her steel problem Brazil will be solving two other problems: First, by converting part of her 15,000,000,000 tons of iron ore into finished products she will materially diminish the need for imports, employ thousands of Brazilians and increase the wealth and buying power of the nation; and second, she will keep the steel industry under Brazilian control. Both Japan and Germany have sought to obtain the monopoly, and it has been feared that such economic influence would tend to harm Brazilian-American relations."

Jessop Steel Develops Non-Magnetic Alloy Steel

• • • A free machining alloy steel possessing low magnetic permeability with high physical properties has been developed especially for electrical equipment inclosures and parts by the Jessop Steel Co., 537 Green Street, Washington, Pa. This non-magnetic steel has a magnetic permeability of only 1.003 to 1.006 at 1000 Oersteds magnetizing force at temperatures from sub-zero to boiling. Another property of this steel is its high electrical resistance (69 to 71 microhms per cm.) which considerably reduces current eddy loss.

In the annealed condition, this steel has a tensile strength of 80,000 to 110,000 lb. per sq. in.; yield point, 35,000 to 60,000 lb.; elongation in 2 in., 25 to 50 per cent; reduction of area, 30 to 60 per cent; Izod impact value (at room temperature), 80 ft.-lb. Jessop non-magnetic steel can be formed, welded, machined or blanked.

Falk Corp. Workers Left With no Bargaining Agency

Milwaukee

• • • A three-year battle before the National Labor Relations Board and in the courts between the CIO and the Falk Corp. over the proper bargaining agency for some 1500 workers was ended by a called election by the NLRB which has left the employees without any bargaining agency whatsoever. Because the CIO local withdrew its petition for a plant-wide election for production workers, the balloting was confined to 20 powerhouse employees who voted 14 to 6 against representation by the AFL Operating Engineers' Union. The company's independent union was disestablished last January when the Supreme Court upheld the national board's order.

An unusual scheme whereby a CIO union at the Allen-Bradley Co. plant, failing to obtain an agreement from the company, had its members in the plant enter into an agreement with the union to remain in good standing for two years or forfeit their employment was held invalid in an exhaustive decision by a local circuit court judge. The decision was prompted by the fact four employees who had signed the agreement subsequently left the union

but kept on working. The union brought suit. Now the CIO legal talent plans an appeal.

The judge said in his decision:

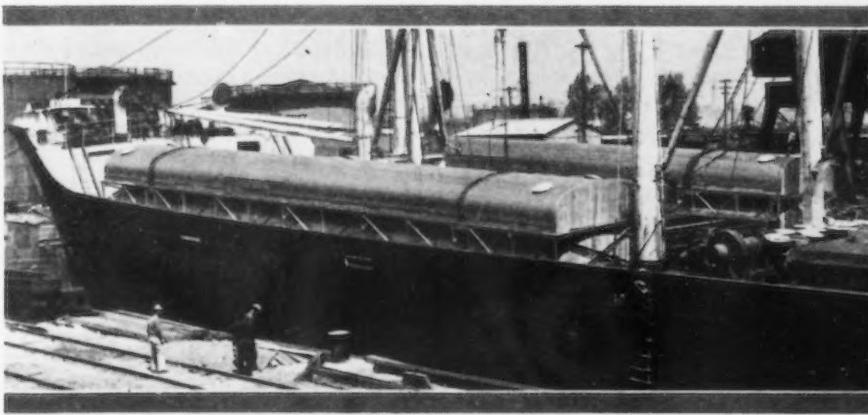
"The right to pursue lawful employment unmolested is the most sacred right of citizenship. The contract violates public policy. It is unreasonable, arbitrary and oppressive. It violates the state and federal constitutions by unreasonably restricting the rights of the defendants to contract for their labor."

Milwaukee Trying to Keep Skilled Workers From Moving

Milwaukee

• • • To prevent as much as possible the migration of skilled workmen from the Milwaukee area, the Wisconsin and Federal public employment officials are urging Milwaukee County employers to list all possible job openings so that expected increased employment and improved industrial conditions can be adequately provided for. They contend it is folly to allow appeals from other states to draw these workers away when they may be urgently needed in the Milwaukee area.

DELIVERY OF 28 STAINLESS STEEL railway cars to the Portuguese National Railway has been effected by the Edward G. Budd Mfg. Co., Philadelphia, which built them. Word has been received that the last of the cars on the Franco-Iberian Line freighter *Cypria* had reached Lisbon. These are the first streamlined cars built in this country for export, according to the Budd company, which photographed a shipment at the dock in Philadelphia prior to a dash to Europe's only free port.



Peacetime Peak For Bethlehem in Unfilled Orders

Bethlehem Steel Co.'s unfilled orders, swelled by recent Navy contracts, were at an all-time peacetime peak of \$288,521,487 as of June 30, E. G. Grace, president of the company, revealed last Thursday at a press conference following the quarterly meeting of directors. Since June 30, he said, new Navy business amounting to nearly \$200,000,000 has been placed with Bethlehem.

Mr. Grace also stated that the company's current operations are at 99 per cent and that new business up to July 25 had been coming in at a rate 30 to 40 per cent in excess of present capacity production.

Net profit for the second quarter was reported as \$10,807,318, equal to \$3.07 a common share, compared with \$10,891,139, or \$3.02 a share in the first quarter and \$3,822,927 or 61c. a share in the second quarter of 1939.

The fact that second-quarter earnings totaled slightly less than those of the first quarter may be accounted, partly at least, by the fact that second-quarter production averaged 82.6 per cent against a first-quarter figure of 87.4 per cent.

Mr. Grace said that the steel industry would be able to meet the needs of the national defense program and at the same time take care of the normal requirements of all commercial users. He said, however, that some expansion of the industry's facilities in non-commercial steel such as armor plate would be necessary and will be under way soon. In addition to the Naval ordnance plant at Charleston, W. Va., the armor plate makers are Bethlehem, Carnegie-Illinois Steel Corp. and the Midvale Co. Mr. Grace also said that with the completion of one 50-ton electric furnace in September and a second one in October, Bethlehem's electric furnace steel capacity will be increased about 10,000 tons a month.

Mr. Grace also said that there must be a material expansion of facilities for the manufacture of

guns, projectiles, etc., and for shipbuilding. Bethlehem's shipyards are now undergoing expansion, the cost of which the government is paying and it will own the new facilities outright. Mr. Grace said he did not think it proper to use stockholders' money to finance improvements which would have no commercial value after this emergency.

"The government must either purchase and own the facilities," he said, "or it must finance the construction of the new plant which is to be operated by private industry or permit private industry to create the facilities needed to get sufficient business and make sufficient profit to compensate it for creating these facilities."

Mr. Grace noted a general improvement in steel business, with fabricated steel showing greater activity in the construction of plants, airports, etc., while railroads are buying more for current maintenance needs in addition to some new equipment. New rail business is expected to materialize later.

Wage Ruling on Armor Plate Will Not Be Rescinded

Washington

• • • The Labor Department's Public Contracts Division, administrative agency of the Walsh-Healey Public Contracts Act, last week declined to recede from a previous ruling that armor plate is included among products covered by the Walsh-Healey steel wage determination, which prescribes minimum rates of wages for companies contracting with the government.

The announcement, which took the form of a letter to the Navy Department, said that it was the unqualified conclusion of the division that the steel wage order, effective May 28, is applicable to manufacturers of "armor plate and forged plate."

The Labor Department ruled on May 28 that the steel wage order specifically included armor plate, galvanized strips, sheets, plates and galvanized structural shapes, but the Midvale Co. of Philadelphia subsequently asked the Navy Department for a further interpretation.

War Contracts In Canada Let At a Rapid Rate

Ottawa

During the first three months of its existence—from April 9 to July 9—the Department of Munitions and Supply awarded more contracts than were let during the preceding nine months by the two predecessor purchasing bodies.

From July 14 last to March 31 the Defense Purchasing Board and the War Supply Board placed a total of 11,170 contracts, while during the last three months the Department of Munitions and Supply contracts totaled 12,336. The number of contracts awarded during the first quarter of 1940 averaged approximately 1900 per month while the number in the second quarter exceeded more than 4000 per month. During the month of May contracts were awarded to the average of 170 daily.

Contracts placed by the Department during the last three months amount approximately to \$65,800,000. This figure does not include the commitments made for new plant construction or extensions to plant facilities amounting in all to approximately \$50,000,000. Many of these commitments were on behalf of the United Kingdom for whom the contracts placed for war materials at the end of June amounted to \$54,000,000.

The total automotive orders placed by the Department of Munitions and Supply and its predecessor bodies now comprise some 36,000 units costing together with special bodies, wheels and tires, approximately \$67,000,000, according to an announcement made today by C. D. Howe, Minister of Munitions and Supply. Shortly, further orders will be placed for another 7000 units.

The Canadian facilities to produce mechanized equipment are being expanded as rapidly as possible, and before the end of the year the productive capacities of the plants should reach 5000 automotive units a month.

Final arrangements have been completed between Ralph P. Bell, the directing head of aircraft pro-

duction in Canada, and Morris W. Wilson, representing Lord Beaverbrook, British Minister of Aircraft Production, whereby every Canadian resource for the manufacture of aircraft will be fully employed during the next 18 months. Any Canadian aircraft manufacturing facilities not now employed in the production of training and service craft for Canadian purposes will obtain full capacity orders in the immediate future for fighting planes of various types. The orders will be placed jointly by Great Britain and Canada.

The immediate construction of a \$1,000,000 plant for the manufacture of sulphuric acid was announced by C. D. Howe, Minister of Munitions and Supply. The plant is one of the components in Canada's enlarged munitions program in which the construction of 14 plants involving an expenditure of \$31,000,000 has been an-

French Engineers Aid Canadian War Program

• • • Six French engineers headed by Colonel A. Lhomme have placed themselves and their services at the disposal of the Department of Munitions and Supply, according to an announcement made today by C. D. Howe.

It is understood that these French engineers, who have recently arrived in Ottawa, will be engaged in developing the Canadian munitions program.

nounced within the past 10 days.

The new sulphuric acid plant will be erected close to one of the major explosives projects now under construction. It is being built for British account under the supervision of the Department of Munitions and Supply by the Nichols Chemical Co.

A GROUP OF WELL KNOWN INDUSTRIAL and labor leaders met in Washington last week to develop a coordinated program for the training of workers for defense industries. Photographed as they were seated at luncheon, they are as follows:

Left to right, seated: Albert Sobey, director of General Motors Institute; Walter Mathesius, vice-president in charge of operations of United States Steel Corp.; William F. Patterson, chief of the apprenticeship division of the U. S. Department of Labor; Clinton Golden, director of the Northeastern region of the Steel Workers Organizing Committee; Owen D. Young, chairman of the meeting; Walter Reuther, United Automobile Workers of America; E. J. Robeson, personnel manager of Newport News Shipbuilding & Dry Dock Co.; John Green, president of the Industrial Union of Marine and Shipbuilding Workers of America; K. F. Ode, personnel manager of the Falk Corp., Milwaukee.

Standing are Randall Irwin of the Lockheed Aircraft Corp. (at left); M. F. Burke, Pratt & Whitney division, United Aircraft Corp.; Marion Hedges, International Brotherhood of Electric Workers; W. G. Marshall, vice-president Westinghouse Electric & Mfg. Co.



Board Named to Study Domestic Manganese Ores

Washington

Further review of processes for recovering manganese from low-grade domestic ores has been ordered by the minerals division of the National Defense Advisory Commission. A nine-member committee, to be identified as the Technologic Committee on Manganese of the National Academy of Sciences and the National Research Council, will study a wide range of concentrating and metallurgical processes.

Expressing the hope that it will be possible shortly to select the "more promising projects" for government aid where needed, commission officials said that all processes will be reviewed as soon as possible in consultation with specialists and industrialists already engaged in their development.

Charles H. Herty, Jr., metallurgist with Bethlehem Steel Co., and John Johnston, director of research, United States Steel Corp., are among the members of a nine-man committee named by the National Academy of Sciences under arrangements made by the defense commission. Other members are:

Clyde Williams, director, Battelle Memorial Institute, Columbus, Ohio, chairman; A. C. Fieldner, chief, Technologic Branch, Bureau of Mines, secretary; Dr. Fred G. Cottrell, Washington; James Critchett, vice-president, Union Carbide and Carbon Research Laboratories, New York City; John V. N. Dorr, Dorr Co., Westport, Conn.; Donnel F. Hewett, principal geologist, United States Geological Survey, Washington; Gilbert Seil, director of research, E. J. Lavino & Co., Philadelphia.

Machine Tool Dealers Will Meet Oct. 21 and 22

• • • The Associated Machine Tool Dealers of America will hold their annual convention in Dayton, Ohio, at the Dayton-Biltmore Hotel, on Oct. 21 and 22.

Scrap Licensing Proclamation Applies Only To No. 1 Steel

Washington

• • • The Presidential proclamation issued last Friday night subjecting iron and steel scrap to a licensing system applies only to No. 1 heavy melting steel. Licensing becomes effective on Aug. 1. It is estimated that of all the scrap exported from the United States only between 15 and 20 per cent consists of this standard grade of old material. Since this ratio applies to Japan, the chief country of export, as well as to other foreign countries, the licensing order will not have the sweeping effect on Japan that has been indicated by published reports.

It is estimated that Japan purchased in excess of 200,000 gross tons of scrap in the United States between early June and the end of the third week of July. While Japan is said to have sought No. 1 only, it is said that not more than 35,000 or 40,000 tons of its purchases consisted of that grade. The tonnage comprised principally bundled sheets and No. 2 heavy melting steel. Much of the latter, it is said, has no ready market in domestic consumption.

Despite the limited effect of the scrap licensing system, Japan has formally protested to the State Department against its application and is reported to have threatened reprisal by shutting off American imports of tin and rubber from the South Sea Islands. Whether or not these threats are only political gestures, as some think, remains to be seen. The

proclamation, which followed an order issued on July 23 also applies to petroleum and petroleum products.

In 1939 Japan imported 2,027,000 tons of scrap from the United States compared with 1,382,000 in 1938, while for the first five months of the current year American shipments of scrap to Japan declined to 354,607 tons, compared with 856,358 tons in the corresponding period of 1939. May shipments had dropped to 66,860 tons as compared with a high of 248,176 tons last October, and an average of 169,000 tons in 1939. The drop is attributed partially to Japan's conservation of exchange. The other principal country importing scrap from the United States is the United Kingdom now that Italy has been shut off.

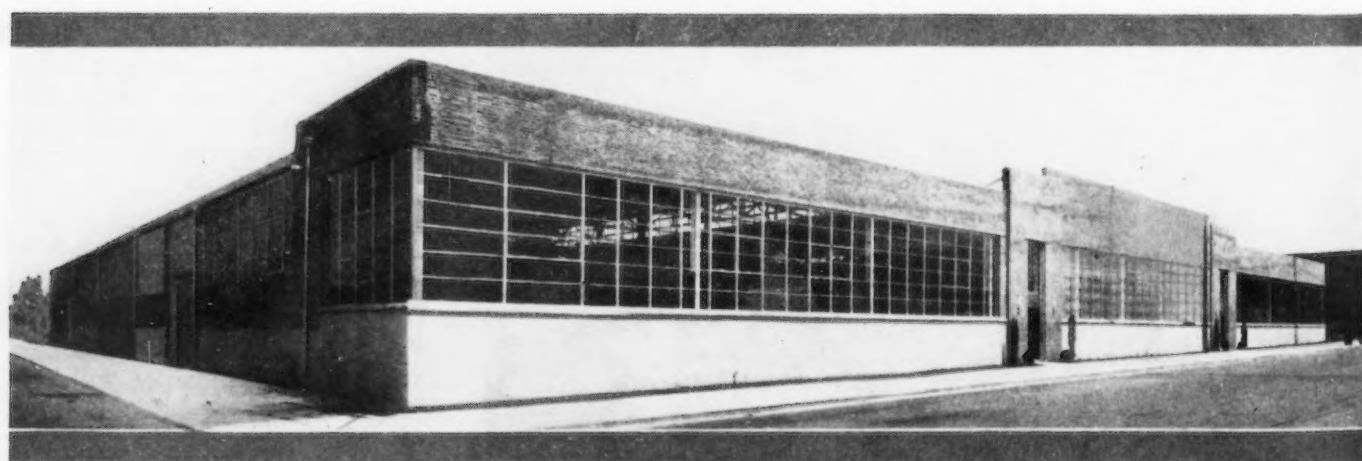
The President said that licensing instituted for scrap and oil was purely a question of national defense. The proclamation and

regulations were issued under the export control provision of the May-Sheppard Act of July 2. Under this provision exports are licensed or rejected by Lieut. Col. R. L. Maxwell, administrator of control. Applications for licenses are directed to the State Department whose Division of Export Control grants clearance upon recommendation of the Administrator of Control.

The proclamation requiring licenses for export of No. 1 heavy melting steel and petroleum and petroleum products applies regardless of whether foreign buyers have completed contracts for their purchase in the United States. President Roosevelt took occasion to point out the inaccuracy of published reports that these products had been subjected to embargoes. He explained that this was not true, that they were subject only to license. The belief, however, prevails that, except for shipments to British possessions and non-belligerent countries, exports will be sharply curtailed.

Despite the fact that licensing has been applied to No. 1 heavy melting steel, there have been no reports of scarcity of this grade. On the contrary an ample supply is indicated by the behavior of the market, which has been falling. The Bureau of Mines report for the first quarter of 1940 reported only a slight decline in scrap stocks as compared with the end of 1939. Purchased No. 1 heavy melting scrap stocks—at plant and in transit—on March 31, 1940, was given as 731,851 tons. Stocks of open-hearth grades of home scrap on that date totaled 1,310,150 tons.

THOUGH this building was not designed for national defense manufacturing, the rapidity of its construction affords an example of what can be done within a short period in providing new manufacturing space that may be required for armament manufacture. The building, covering 60,000 sq. ft., was erected in 45 days from the date of the signing of the contract. It was erected at Oakland, Cal., by the Austin Co., Cleveland, for the Allis-Chalmers Mfg. Co.



GALLUP POLL SHOWS BUSINESS REGAINING FAVOR

A Gallup poll recently taken shows "that there is comparatively little sentiment left in the nation for greater regimentation of business in the interests of reform." Dr. Gallup, in announcing the poll, says that fact "may have an important bearing on the Presidential campaign, particularly in connection with attacks on Mr. Willkie as a representative of big business."

The survey explored opinions on two issues—regulation of business and regulation of labor unions. A cross-section of voters in all areas and income levels was asked:

"During the next four years do you think business should be regulated to a greater extent by the Federal Government?"

Those expressing an opinion voted as follows:

Yes	33%
No	67

Approximately one voter in six (17 per cent) had no opinion.

The second question was:

"Do you think labor unions should be regulated to a greater extent by a Federal Government?"

On this question those expressing an opinion voted:

Yes	75%
No	25

Roughly one person in five (18 per cent) expressed no opinion.

Commenting on these results, Dr. Gallup says:

"The results indicate that more than twice as many voters favor greater regulation of labor as favor greater regulation of business. Attitudes toward the subject vary sharply, however, by income groups. About half of voters in the lower-income brackets are for greater regulation of business, as compared to less than one-fifth in the upper-income group. However, all economic groups—even those made up predominately of skilled and unskilled labor—are in favor of greater union regulation."

"The chief reason why the majority oppose further industrial regulation, the poll shows, is that the Government has 'already gone

far enough' and that further regulation would be 'too much like dictatorship.' Those are the reasons given by voters themselves.

"On the question of regulating labor unions, the general attitude expressed in the comments of voters is that 'unions are too powerful and have gone too far,' that many unions have become 'rackets,' and that regulation is needed to protect union members from 'unscrupulous leaders in their own ranks.'

Foundry Workers Being Trained at Cleveland

Cleveland

• • • Foundry classes started recently in the Cleveland Trade School, as an extension of the participation by the Cleveland Board of Education in the Federal Government's program of training skilled workers for national defense.

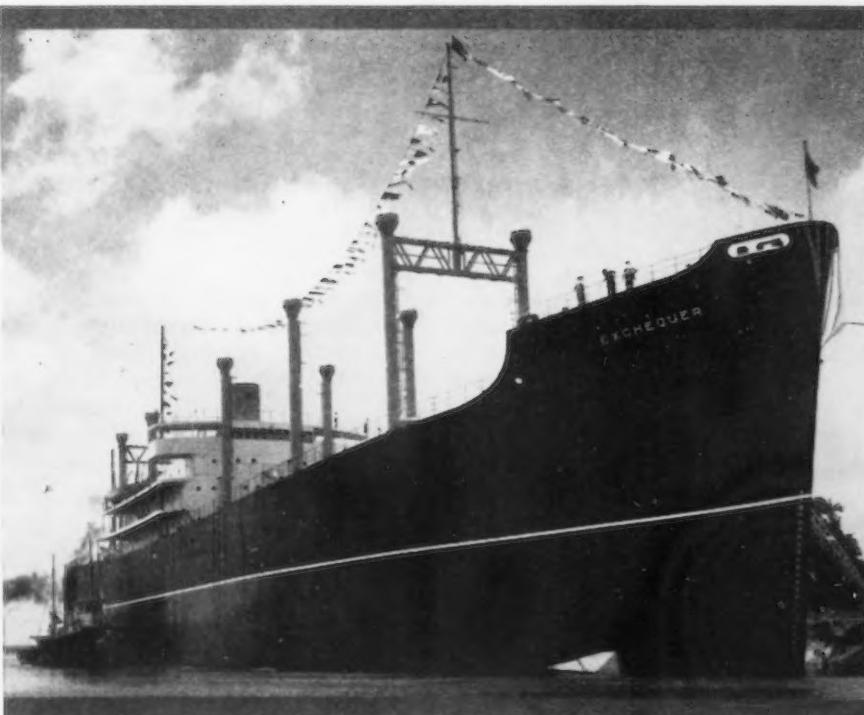
It is planned to conduct two classes of 25 students each for a

period of seven weeks. In addition to offering training in foundry work, the classes will supply castings for use in the national defense shop training courses now being taught at East Technical and West Technical high schools.

The decision to inaugurate the foundry classes was made after the foundry sub-committee of the Cleveland Chamber of Commerce reported that any abnormal pressure of orders for foundries here would cause a shortage of trained foundry workers.

Members of the committee were: George J. Leroux, assistant manager of National Malleable & Steel Casting Co.; B. H. Aiken, superintendent of Crucible Steel Casting Co.; R. C. Hamburg, superintendent, Eberhard Mfg. Co.; Malcolm Love, employment manager, Ferro Machine & Foundry Co., F. W. Pascoe, factory superintendent, Westinghouse Electric & Mfg. Co., and H. G. Wellman, secretary-treasurer, Wellman Bronze & Aluminum Co.

THE LARGEST ALL-WELDED STEEL ship constructed in the United States is the new Exchequer, according to the Ingalls Shipbuilding Corp., Birmingham, from whose yard at Pascagoula, Miss., the boat was recently launched.



Government Contracts

• • • Federal contracts for iron and steel products, as reported to the Labor Department's Public Contracts Division for the week ended July 20 (orders less than \$25,000 omitted).

Iron and Steel Products

Lundquist Tool & Mfg. Co., Worcester, Mass., Telescope Mounts, \$39,240.
 Hart Mfg. Co., Louisville, Army Ranges, \$59,578.
 William R. Bootz, Successor to Crescent Stove Works, Evansville, Ind., Fire Units for Field Range, \$50,724.
 Remington Rand, Inc., Buffalo, Cabinets for Field Range, \$98,839.
 Graybar Electric Co., Inc., Washington; Hubbard & Co., Cicero, Ill., Wire Rope Fittings, \$77,411.
 Crucible Steel Co. of America, New York, Steel, \$33,162.
 Eclipse Aviation, division of Bendix Aviation Corp., Bendix, N. J., On-Carriage Parts, \$267,491.
 Peco Mfg. Corp., Philadelphia, Eyebolt Lifting Plugs, \$106,917.
 Darby Products of Steel Plate Corp., Kansas City, Kan., Steel Rack Castings, \$29,156.
 North & Judd Mfg. Co., New Britain, Conn., Tips, Clasps and Slides, \$35,431.
 Hunter Steel Co., Pittsburgh, Radial Gates, \$202,000.
 Marshall Stove Co., Lewisburg, Tenn., Stoves, \$25,002.
 Graver Tank & Mfg. Co., Inc., East Chicago, Ind., Steel Tanks, \$157,040.
 Bethlehem Steel Co., Bethlehem, Pa., Steel Tanks, \$222,892.
 Bethlehem Steel Co., Bethlehem, Pa., Tinplate, \$126,146.
 Crown Iron Works Co., Minneapolis, Piers, \$56,235.
 Carnegie-Illinois Steel Corp., Baltimore, Tinplate, \$32,086.
 Jones & Laughlin Steel Corp., Pittsburgh, Tinplate, \$46,790.

Nonferrous Metals and Alloys

Mueller Brass Co., Port Huron, Mich., Heads, \$139,143.
 Bart Laboratories, Belleville, N. J., Searchlight Mirrors, \$72,460.
 American Magnesium Corp., Cleveland; Aluminum Cooking Utensil Co., New Kensington, Pa., Range Equipment, \$67,719.
 General Fireproofing Co., Youngstown, Aluminum Chairs, \$83,093.
 General Bronze Corp., Long Island City, N. Y., Dolly Assemblies, \$54,652.
 Revere Copper & Brass, Inc., Baltimore, Brass Tubing, \$48,902.
 Calumet & Hecla Consolidated Copper Co., Hubbell, Mich., Copper Ingots, \$86,625.
 Scovill Mfg. Co., Waterbury, Conn., Primer Bodies, \$232,500.
 Scovill Mfg. Co., Waterbury, Conn., Primer Bodies, \$43,500.

Machinery

New Britain-Gridley Machine Division, New Britain Machine Co., New Britain, Conn., Chucking Machine, \$77,880.
 Electric Boat Co., Groton, Conn.; Maxim Silencer Co., Hartford; Griscom-Russell Co., Massillon, Ohio, Mufflers, Evaporators, Distillers, \$64,260.
 Yates-American Machine Co., Beloit, Wis., Borers, \$56,742.
 Norton Co., Worcester, Mass., Grinders, \$28,758.
 Seifreat-Elstad Machinery Co., Dayton, Ohio, Honing Machines, \$258,632.
 York Ice Machinery Corp., Philadelphia, Refrigerating Plants, \$91,590.
 De Laval Steam Turbine Co., Trenton, N. J., Centrifugal Pumps, \$64,745.
 American Hoist & Derrick Co., St. Paul, Derricks & Hoists, \$29,707.

War Department Contracts

The war Department on Monday announced the following awards:
 Guiberson Diesel Engine Co., Dallas, Tex., radial air-cooled diesel engines with spare parts, \$2,915,255.

Norris Stamping Co., Los Angeles, cartridge cases, \$1,673,700.
 Chase Brass & Copper Co., Inc., Waterbury, Conn., cartridge cases, \$1,352,556.

Continental Motors Corp., Muskegon, Mich., radial air-cooled gasoline engines with spare parts, \$1,342,681.

Allis-Chalmers Mfg. Co., Milwaukee, tractors, \$1,234,137.
 Hercules Powder Co., Wilmington, Del., explosives, \$458,160.
 Budd Wheel Co., Detroit, shells, \$447,037.

Gilbert & Barker Co., Springfield, Mass., fire control instruments with spare parts, \$440,831.

Scovill Mfg. Co., Waterbury, Conn., cartridge cases, \$242,000.
 Behn Aluminum & Brass Corp., Detroit, metal parts for booster, \$123,625.
 The Tredegar Co., Richmond, Va., target practice projectiles, \$99,855.
 Eclipse Aviation, division of Bendix Aviation Corp., Bendix, N. J., sets on-carriage parts, less indicators for data transmission system, with spare parts, \$43,331.

Bausch & Lomb Optical Co., Rochester, N. Y., flank spotting instruments, \$39,000.

National Tube Co. Gets \$25,000,000 Federal Award

Pittsburgh

The National Tube Co. has received an award from the United States government amounting to \$25,000,000 for the production of airplane bombs and projectiles. Shipment of bombs from the Christy Park works of National Tube Co. will begin within a month, an accomplishment which is probably made possible by the fact that the plant has been producing airplane bombs for the government for several years, although in substantially smaller lots. Regular production of projectiles will await the installation of additional machinery.

The airplane bombs will be manufactured from seamless pipe.

Vulcan Iron Works Goes To Empire Ordnance Co.

Control of Vulcan Iron Works, Wilkes-Barre, Pa., manufacturer of small locomotives, conveying equipment and hoists, has been acquired by Empire Ordnance Co., Philadelphia. The Vulcan plant also has large foundry facilities.

Previous to the acquisition of the Vulcan plant, the ordnance company had purchased the machine shop facilities of the Pencoyd (Philadelphia) plant of Carnegie-Illinois Steel Corp. and equipped the plant for the production of anti-aircraft and other guns. It is understood that the gun forgings will be machined at the Pencoyd plant, while such fabricated work as gun carriages, etc., will be produced at the Vulcan works.

The corporation had also previously leased facilities from the Willys-Overland Co. at Toledo.

Hiring of employees at the Pencoyd plant started July 26.

E. Perry Holder, executive vice-president of the ordnance company, will be the new operating head of the Vulcan division. Benjamin S. Dowd is president of the Empire Ordnance Corp. and J. F. Mitchell is plant engineer of the Pencoyd shop.

NEWS OF INDUSTRY

\$200,000,000 in Navy Awards For Shore Facilities

Washington

• • • Under the impetus given the naval expansion program by the Naval Appropriation Act, authorizing the negotiation of contracts without regard to the customary competitive bidding requirements, the Navy Department since June 13 has awarded an estimated \$200,000,000 in contracts covering a wide range of construction and improvements at the various naval shore establishments. Large tonnages of steel, particularly sheet piling and structural shapes, will be required. Some of the more extensive projects, all awarded on a cost-plus-fixed-fee basis, include the following:

Corpus Christi, Tex., new naval air station, \$23,381,000, Brown & Root, Inc., and W. S. Bellows of Houston, Tex., and Columbia Construction Co., Oakland, Cal.; naval station, Key West, Fla., destroyer and tender moorings, \$10,964,000, Merritt-Chapman & Scott Corp., New York; submarine base, New London, Conn., general improvements including waterfront buildings and new marine railway, \$2,303,000, F. H. McGraw & Co., Hartford; marine barracks, Quantico, Va., aviation and Marine Corps facilities, \$1,460,250, John McShain, Inc., Philadelphia.

Portsmouth (N. H.) Navy Yard, shipway, barracks, extensions of buildings and accessories, \$1,130,000, Aberthaw Co., Boston; naval air station, Pensacola, Fla., aviation facilities, \$4,000,000, Hardaway Contracting Co., Columbus, Ga.; naval air station, Miami (Opa Locka), Fla., aviation facilities, \$3,500,000, Fred Howland, Inc., and Jack Quinn, Inc., Miami; naval air station Jacksonville, Fla., aviation facilities, \$12,786,000, Duval Engineering & Contracting Co., and George D. Auchter Co., of Jacksonville, and Batson-Cook Co., West Point.

Aviation shore facilities, Norfolk, Va., \$12,700,000, Virginia Engineering, Inc., Newport News, Va.; New York Navy Yard, storehouse \$4,000,000 Turner Construction Co., New York; aviation facilities, Coco Solo, Canal Zone, \$11,-

050,000, Lindgren & Swinnerton, Inc., San Francisco, Hegeman-Harris Co., Inc., New York, Tucker McClure, Balboa, C. Z.; naval air station, Alameda, Cal., aviation facilities, \$9,800,000, Johnson, Drake & Piper Inc., Minneapolis.

Naval air station, Guantanamo Bay, Cuba, defense and aviation facilities, \$5,190,000, Frederick Snare Corp., New York; Pearl Harbor and other islands in Pacific, aviation facilities, including buildings, fuel storage, dredging, \$30,870,000, Turner Construction Co., New York, Morrison-Knudsen Co., Inc., Los Angeles, and J. H. Pomeroy & Co., Inc., San Francisco; naval air station Quonset Point, R. I., aviation shore facilities, \$24,204,000, George A. Fuller Co., New

York City, Merritt-Chapman & Scott Corp., New York.

Naval operating base, San Diego, Cal., Marine Corps barracks, \$1,630,000, Los Angeles Contracting Co., Los Angeles; naval operating base, San Diego, aviation facilities, \$3,313,900, M. H. Golden and Walter Trefts, Los Angeles; New York Navy Yard, alterations to shipways No. 1, and armored deck facilities, \$1,775,000, J. Rich Steers, Inc., New York; Puget Sound area, Wash., aviation, fuel oil, ammunition-storage facilities, \$7,300,000, The Austin Co., Cleveland; Boston Navy Yard, and New London, Conn., submarine base, powerplant improvements, \$1,325,000, Stone & Webster Engineering Corp., New York.

Vinson Act Applies To Steel Contracts

Washington

The Bureau of Internal Revenue has ruled that a contract for steel sheets and plates for vessels being built in Navy yards to replace existing ships is within the scope of the profit-limiting provisions of the amended Vinson Act which restricts profits on ships and aircraft to 7 per cent on a negotiated contract basis and to 8 per cent on a competitive bidding basis.

A steel company had raised the point whether contracts for steel for the Navy, which is now purchased on a six-months' basis, came within the profit-limiting terms of the amended Vinson Act of June 28, 1940. In mind was the fact that steel now in stock was purchased before the act was amended.

The company, it was pointed out, will be required to pay into the Treasury any excess profit on the contract, less the amount of any federal income taxes paid or remaining to be paid on the amount of such excess profit.

On the other hand, the previous 10 and 12 per cent limitations are applicable to subcontractors if the prime contract was entered into prior to amendment of the act.

The Commissioner of Internal Revenue, the Secretary of War and the Secretary of Navy have issued joint rules governing the procedure for certifying cost of addi-

tional equipment and facilities required for construction by private contractors of naval vessels and army and navy aircraft. The purpose of the certification is to determine excess profits.

Provision is made for four types of certification: certification upon estimated cost; supplemental certification; certification as to necessity, cost and percentage; and final certification as to percentage.

The rules said that it is not essential that special additional equipment and facilities be designed exclusively for any special type of work to be performed under the contract or subcontract or that the special additional equipment and facilities be adaptable only for work required under the contract or subcontract. However, no certification will be made in the case of any item of additional equipment and facilities, which, in the absence of the contract or subcontract, would be reasonably necessary in the contracting party's operations. Certification will be made only at the proper request of the contractor. In the event a contracting party does not avail himself of the certification procedure, the government will presume that depreciation and obsolescence only is allowable as an element of cost.

Determination of the percentage of cost of any item to be charged against the contract or subcontract, it was pointed out, "will depend upon the facts in the particular case."

U. S. Steel Now at 94 Per Cent, Backlogs Large, Profits Higher

New York

• • • Current operations of United States Steel Corp. are at 94 per cent of capacity, highest since August, 1929, Irving S. Olds, chairman of the board, revealed in an interview following the quarterly meeting of the board of directors on Tuesday. Orders, Mr. Olds said, are running at a very high level and are in excess of shipments, as they have been for some time.

Export shipments in the quarter accounted for about 13 per cent of total shipments and Mr. Olds said he did not expect any material change from this pace in the next quarter.

Backlogs of rolled and finished steel, as of the current week, were 2,500,000 net tons. The corporation's annual rolled and finished capacity is slightly in excess of 19,000,000 tons.

A moderate expansion of armor plate facilities is under way, Mr. Olds said, but this is largely limited to the Navy-owned plant at Charleston, W. Va., which is operated by Carnegie-Illinois Steel Corp. for the Government. Failure of the Government to act on the new plant amortization plan recently proposed by the National Defense Advisory Commission is delaying the buying of equipment for this expansion plan, he reported. Possibility of expansion of the corporation's electric steel capacity is under consideration, the chairman reported, but no definite steps have been taken.

Questioned about fourth quarter prices, Mr. Olds said that it was too early to discuss that matter.

Although shipments of rolled and finished steel in the second quarter were practically unchanged, on a percentage basis, from the first quarter, the corporation's net earnings advanced to \$19,201,008 in the June quarter from \$17,113,995 in the preceding quarter. The June period's earnings were equal to \$1.48 per common share after preferred requirements. In the second quarter of 1939, earnings were \$1,309,761 and shipments were at 48.2 per cent of capacity.

A common share dividend of \$1, payable on Sept. 20, was declared by the directors, along with the regular dividend of \$1.75 on the preferred stock.

Payrolls in the first six months of 1940 totaled \$199,871,911, an increase of 22.3 per cent over the corresponding period of 1939, while average number of employees rose from 208,113 in the first half of 1939 to 242,144 in the first half of the current year, a gain of 16.4 per cent.

A comparison of the second quarter results with the first quarter follows:

	Second Quarter 1940	First Quarter 1940
Operating profit	\$22,009,147	\$19,170,709
Net income, after all de- ductions	19,201,008	17,113,995
Shipments of finished steel, net tons	3,201,645	3,086,753
Per cent of capacity..	66.4	66.9



Armco Wipes Out Preferred Arrearages; Earnings Gain

Net earnings of American Rolling Mill Co. for the second quarter, after depreciation and federal taxes, were \$1,079,405, as compared with \$875,671 in the June quarter of 1939. Earnings in the first six months of the current year are \$2,084,599, as against \$1,669,151 in the corresponding period of 1939. The company also declared a dividend of \$1.12½ on the 4½ per cent cumulative preferred stock which wipes out all arrearages on that stock.

Other steel and metal-working company earnings for the second quarter reported in the past week follow:

Youngstown Sheet & Tube Co.	\$1,169,283
Alan Wood Steel Co.....	224,313
Keystone Steel & Wire Co....	1,418,200*
Midland Steel Products Co...	443,442
Baldwin Locomotive Works†	1,734,344*
National Acme Co.....	721,504
Blaw-Knox Co.	602,717‡
Pittsburgh Coke & Iron Co.	143,029
Otis Steel Co. (Loss).....	196,629

*Covers fiscal year ended June 30.

†Includes Midvale Co.

‡Six months ended June 30.

Huge Contracts Let for Aircraft

Washington

• • • The National Defense Advisory Commission made public early this week a list of aircraft contracts totaling close to \$85,000,000 which have been "cleared" by the agency since June 6, but War Department officials were quick to point out that with one or two exceptions the contracts are tentative and are being withheld at the request of aircraft manufacturers pending more definite government assurances on the question of amortizing necessary expansion costs.

For aircraft—Boeing Aircraft Co., Seattle, \$31,871,349; Consolidated Aircraft Corp., San Diego, Cal., \$16,361,342; Aviation Mfg. Corp., Downey, Cal., \$7,562,834; Stearman Aircraft, Wichita, Kan., \$3,779,628 and \$1,933,761; Beech Aircraft Corp., Wichita, Kan., \$3,510,746; Ryan Aeronautical Corp., San Diego, Cal., \$2,074,070; Boeing Airplane Co., Wichita, Kan., \$2,041,947; Spartan Aircraft Co., Tulsa, Okla., \$1,859,880; Continental Motors Corp., Muskegon, Mich., \$1,442,275; Fairchild Engine & Airplane Corp., Hagerstown, Md., \$993,844; Cessna Aircraft Co., Wichita, Kan., \$900,378.

For aircraft engines—Ranger Aircraft Engines, Long Island City, N. Y., \$5,489,308; Aviation Mfg. Corp., Lycoming Division, Williamsport, Pa., \$1,541,448; Wright Aeronautical Corp., Paterson, N. J., \$1,488,272 and \$562,951.

The contracts announced by the defense commission, covering a wide variety of defense requirements, aggregated \$1,650,000,000 and represented Army and Navy awards of \$500,000 or more cleared by the commission between June 6 and July 17. The aircraft awards topped the list, which made no distinction between Army and Navy awards. Most of the contracts other than aircraft had previously been reported by either the Army or War or Navy departments.

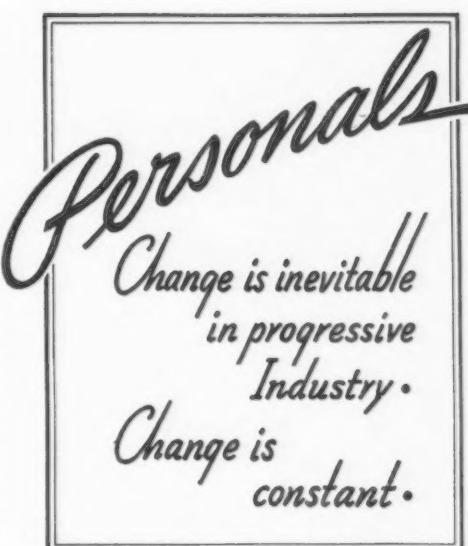
Also listed were \$8,700,000 for artillery to the Watervliet Arsenal; \$16,000,000 in ammunition and bombs at the Picatinny Arsenal; \$5,661,600 in rifles at the Springfield Armory, and \$14,597,630 in cartridges at Frankford Arsenal.

• L. A. Ver Bryck has been appointed Pittsburgh district sales manager, Pittsburgh Steel Co., Pittsburgh, succeeding W. M. Jensen, who recently resigned. Mr. Ver Bryck has been connected with the sales department of Pittsburgh Steel since 1928 except for a period of about a year with the Wheeling Corrugating Co. He formerly was assistant manager, welded fabric and construction products sales for Pittsburgh Steel.

• L. Lockwood York has been appointed sales and service manager of the aircraft engine division, Continental Motors Corp. He formerly was with Air Cooled Motors, Syracuse, N. Y.

• Ralph E. Flanders, president of Jones & Lamson Machine Co., Springfield, Vt., and of Bryant Chucking Grinder Co., has announced his candidacy for the United States Senate, to fill the unexpired term of the late Ernest W. Gibson.

• Edward R. Berkfield, for many years secretary of the Steel Export Association of America, and more recently vice-president of the American Steel Export Co., New York, has been appointed assistant export manager of the Weirton Steel Co., effective Aug. 1. Mr. Berkfield will make his headquarters in the office of the Weirton Steel Co., Chrysler Building, New York.



Armour Institute of Technology in 1917 and is a member of the Society of Automotive Engineers.

• W. Russell Greer, vice-president of the Porcelain Enamel & Mfg. Co., Baltimore, has been appointed chairman of the committee to co-ordinate the porcelain enameling industry for national defense. Other members of the committee are George Blome, vice-president of the Baltimore Enamel & Novelty Co., Baltimore, and C. E. Meisner, Carnegie-Illinois Steel Co., Washington.

• Norman J. Ellis, former member of the Chevrolet personnel department staff at Flint has been made director of the personnel division of Chevrolet at Baltimore, Md.

• Robert A. Hill, recently Mid-Continent manager for Regan Forge & Engineering Co., has been appointed branch manager of the Southwest territory for John A. Roebling's Sons Co., Trenton, N. J. He will make his headquarters in Houston, Tex. Previously he was division manager for the Broderick & Bascom Wire Rope Co. He is a graduate of Rice Institute and has had almost 20 years of association with the oil industry.

• John P. Moran has been elected president of Gemmer Mfg. Co. Mr. Moran, who was vice-president in charge of production, succeeds the late Edward P. Hammond. Mr. Moran joined the organization in



EDWARD R. BERKFIELD, new assistant export manager of Weirton Steel Co.



CLINTON E. STRYKER, vice-president and assistant to the president of the Nordberg Mfg. Co.



ROBERT A. HILL, branch manager of the Southwest territory for John A. Roebling's Sons Co.

1910. In 1925 he was appointed vice-president and factory manager and was responsible for the layout and equipment of the new plant built in 1937 with a capacity of 1,000,000 steering units a year for the automobile industry.

• **Carl Main** recently was appointed executive engineer of Bender Body Co., Elyria, Ohio. **Gilbert Harvey** at the same time was named plant superintendent and, **Bernard Booms** was named sales promotion manager.

• **John Lowe** has been appointed foundry engineer on the technical staff of Battelle Memorial Institute, Columbus. He has had a broad experience as a melter, melting superintendent and production metallurgist at the Campbell, Wyant & Cannon Foundry Co. and as foundry manager for the Vilter Mfg. Co.

• **Allen T. Greiner**, until recently in charge of Salem Engineering Co. works in France, has returned to this country and will be actively engaged in sales and engineering work with the home office at Salem, Ohio.

• **Leon B. Rosseau**, formerly industrial heating specialist for General Electric Co., has joined the staff of the Ajax Electric Co., Inc., Philadelphia, as district sales manager.

• **J. Edward Trainer**, general production manager of all Firestone Tire & Rubber Co. plants, has been elected vice-president of the company.

• **John W. Dobson**, who has had an extended experience in the alkali and metal fields, has been made sales representative for the Cowles Detergent Co., Cleveland. He will cover metropolitan New York and the State of New Jersey south to Trenton.

• **Johan-Rypperda Wierdsma**, for the past five years custom house clerk for the Boston office of Furness Withy & Co., Ltd., has become associated with the Mitchel Metal Products Co., Cleveland.

• **Henry S. Washburn**, president of the H. B. Smith Co., Inc., Westfield, Mass., last week was the guest of the Westfield Rotary Club. He spoke on the "Romance of Iron."

ployee with a continuous employment record for five years.

• **Douglas F. Fesler**, formerly general manager and owner of the Alemite Die Casting & Mfg. Co., died at a hospital in Beverly Hills, Cal., on July 22, aged 65 years. He retired in 1938.

• **Taylor H. Boggis**, formerly of the Taylor-Boggis Foundry Co., Cleveland, which was established by his grandfather, died in Cleveland, July 22, aged 72 years. Mr. Boggis had many business interests until his retirement five years ago, but for most of his life he was active in his family's foundry, one of the earliest in Cleveland.

• **W. Henry Brown**, former vice-president, secretary and treasurer of the Roehms Davison Steel Co., died July 22 at Harper Hospital, Detroit. Mr. Brown was born in Erie, Pa., 73 years ago. He was connected with the steel company for 45 years.

• **Frank Jewell**, 82 years old, who until his retirement in 1939, was president of the Clark Iron Co. of Duluth, Minn., and an executive in numerous other business enterprises, died July 23 at Grand Rapids, Mich.

• **James Dalrymple**, treasurer and general manager of the Frederick Kahl Iron Foundry, died July 23 at his home in Grosse Pointe Farms, Mich. He was born in 1883 at Kirkintilloch, Glasgow, Scotland, and had lived in Detroit for 30 years, being associated with the foundry for 28 years. He was a member of the Gray Iron Founders Association.

• **Jack H. Nierath**, for 15 years Ohio representative for General Drop Forge Co., Buffalo, died July 24 in Cleveland. He was 51 years old.

• **James E. Sayer**, superintendent of the electrical department, Ensley steel works, Tennessee Coal, Iron & Railroad Co., Birmingham, died July 22 after a long illness. He had been an employee of the company 40 years. He was 58 years old.

• **Alfred B. Parker**, president of the Parker, Danner Co., Quincy, Mass., tool manufacturer, died at Wolfeboro, N. H., on July 25. He was 55 years old.

Obituary

Metal Working Activity

Latest Data Assembled by The Iron Age
From Recognized Sources. In Net Tons.

	June 1940	May 1940	June 1939	5 Months 1940	5 Months 1939
Steel Ingots:					
Monthly output ^a	5,426,771	4,841,403	3,523,880	18,303,811	14,139,679
Average weekly output ^a	1,289,723	1,092,867	821,417	1,058,635	824,471
Per cent of capacity ^a	84.97	72.00	53.71	69.75	53.91
Pig Iron:					
Monthly output ^b	3,818,897	3,513,683	2,372,665	17,264,703	11,652,388
Raw Materials:					
Coke output ^c .....	.....	4,349,909	3,141,521	21,813,914	15,456,042
Lake ore consumed ^d	5,212,699	5,114,144	3,169,227	24,774,363	15,838,165
Castings:					
Malleable, orders ^e .....	.....	35,563	29,041	181,922	164,221
Steel, orders ^e .....	.....	.....	37,774	.....	192,382
Finished Steel:					
Trackwork shipments ^f	6,075	7,276	6,832	37,036	27,117
Fabricated shape orders ^f	103,111	121,367	111,594	493,785	529,051
Fabricated plate orders ^f .....	.....	40,408	33,959	171,684	143,078
U. S. Steel Corp. shipments ^g	1,209,684	1,084,057	807,562	6,288,398	1,449,994
Fabricated Products:					
Automobile production ^h .....	.....	391,215	309,738	2,083,892	1,652,251
Steel furniture shipments ^h .....	.....	\$2,102,426	\$1,714,126	\$11,062,756	\$8,792,804
Steel boiler orders ⁱ (sq. ft.) .....	.....	1,065,958	1,032,339	3,797,448	4,206,754
Locomotives ordered ^j	4,235	2,081	1,324	6,350	7,753
Freight cars ordered ^j	31	20	8	156	144
Machine tool index ^j	92.3	92.5	65.5	93.1†	61.2†
††Foundry equipment index ^k	164.9	129.1	101.4	152.5	100.8
Gear sales index ^l	129.0	133.0	90.0	123.0†	92.0†
Non-Ferrous Metals: (U. S. only)					
Lead shipments ^l	49,904	46,919	38,710	218,819	193,508
Lead stocks ^l	55,343	62,955	129,636	.....	.....
Zinc shipments ^m	53,518	59,177	37,284	267,849	208,006
Zinc stocks ^m	70,673	75,036	135,241	.....	.....
Tin deliveries ⁿ (gross tons)	9,225	7,905	4,925	41,384	25,075
Refined copper deliveries ^o	61,716	69,467	53,573	357,151	243,838
Refined copper stocks ^o	199,586	178,664	335,012	.....	.....
Exports: (gross tons)					
Total iron and steel ^p .....	.....	783,964	588,856	3,315,672	2,123,371
All rolled and finished steel ^p .....	.....	272,180	159,188	1,470,524	1,410,728
Semi-finished steel ^p .....	.....	154,849	13,227	517,679	57,785
Scrap ^p .....	.....	312,483	397,321	1,162,736	1,390,064
Imports: (gross tons)					
Total iron and steel ^p .....	.....	8,582	32,587	35,366	144,407
Pig iron ^p .....	.....	317	4,276	5,132	11,578
All rolled and finished steel ^p .....	.....	566	16,050	6,321	82,831

Source of data: ^a American Iron and Steel Institute; ^b THE IRON AGE; ^c Bureau of Mines; ^d Lake Superior Iron Ore Association; ^e Bureau of the Census; ^f American Institute of Steel Construction; ^g United States Steel Corp.; ^h Preliminary estimates by THE IRON AGE—Final figures from Bureau of the Census, U. S. only; ⁱ Railway Age; ^j National Machine Tool Builders Association; ^k Foundry Equipment Manufacturers Association; ^l American Bureau of Metal Statistics; ^m American Zinc Institute; ⁿ New York Commodity Exchange; ^o Copper Institute; ^p Department of Commerce; [†]Institute of Scrap Iron and Steel; ^{††}American Gear Manufacturers Association.

†Three months' average. ††Method of computing index revised in May, 1940.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	July 30 1940	July 23 1940	July 2 1940	Aug. 1 1939		July 30 1940	July 23 1940	July 2 1940	Aug. 1 1939
Flat Rolled Steel:									
(Cents Per Lb.)									
Hot rolled sheets.....	2.10	2.10	2.10	2.00		No. 2 fdy., Philadelphia..	\$24.84	\$24.84	\$24.84
Cold rolled sheets	3.05	3.05	3.05	3.05		No. 2, Valley furnace....	23.00	23.00	21.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50		No. 2, Southern Cin'ti...	23.06	23.06	21.06
Hot rolled strip	2.10	2.10	2.10	2.00		No. 2, Birmingham.....	19.38	19.38	17.38
Cold rolled strip	2.80	2.80	2.80	2.80		No. 2, foundry, Chicago†	23.00	23.00	21.00
Plates	2.10	2.10	2.10	2.10		Basic, del'd eastern Pa...	24.34	24.34	22.34
Tin and Terne Plate:									
(Dollars Per Base Box)									
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00		Basic, Valley furnace....	22.50	22.50	20.50
Manufacturing terne ..	4.30	4.30	4.30	4.30		Malleable, Chicago†	23.00	23.00	21.00
Bars and Shapes:									
(Cents Per Lb.)									
Merchant bars	2.15	2.15	2.15	2.15		Malleable, Valley	23.00	23.00	21.00
Cold finished bars	2.65	2.65	2.65	2.65		L. S. charcoal, Chicago..	30.34	30.34	28.34
Alloy bars	2.70	2.70	2.70	2.70		Ferromanganese‡	120.00	120.00	80.00
Structural shapes	2.10	2.10	2.10	2.10					
Wire and Wire Products:									
(Cents Per Lb.)									
Plain wire	2.60	2.60	2.60	2.60					
Wire nails	2.55	2.55	2.55	2.40					
Rails:									
(Dollars Per Gross Ton)									
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00					
Light rails	40.00	40.00	40.00	40.00					
Semi-Finished Steel:									
(Dollars Per Gross Ton)									
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00					
Sheet bars	34.00	34.00	34.00	34.00					
Slabs	34.00	34.00	34.00	34.00					
Forging billets	40.00	40.00	40.00	40.00					
Wire Rods and Skelp:									
(Cents Per Lb.)									
Wire rods	2.00	2.00	2.00	1.92					
Skelp (grvd)	1.90	1.90	1.90	1.90					
The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 99 to 108 herein.									
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.									

Summary of the Week

CONDITIONS in the steel industry resembling those of the spring of 1937 and the fall of 1939 are becoming apparent as steel companies push operations up to the limit of productive capacity. Shortages of raw steel, pig iron and by-product coke are bottlenecks, as they have been before during periods of high production.

Some large companies have been forced to move ingots from one plant to another to give finishing mills enough steel, additional blast furnaces are being made ready for operation, some that have been idle for a long period will be reconditioned, and projects for new furnace construction are under consideration. With many furnaces still idle, the question of coke supplies is becoming more serious.

Beehive ovens, seldom used to a large extent except in an emergency, are being pressed back into service. In western Pennsylvania about 3300 are in operation as against 1850 in mid-June. The peak of recent years was about 6000 in 1937. Independent owners of ovens are not inclined to recondition them for operation unless higher prices are to be had for coke.

A heat wave throughout the country has prevented steel plants from getting maximum output; nevertheless, the rate for the industry has risen a point and a half over last week to 90½ per cent, a new high for the year to date and within a few points of the peak of last November. This week's rise brings one district, Wheeling-Weirton, to 104 per cent of theoretical capacity, while two other districts, Buffalo and Detroit, continue at 100 per cent, and Chicago has made a further gain to 97 per cent, a new 11-year peak there.

However, three districts, Birmingham, St. Louis and southern Ohio, have shown losses. At Birmingham one open-hearth furnace has been taken off for enlargement, the drop at St. Louis reflects declining demand for tin plate, while in southern Ohio the loss is due to a reduction of sheet and strip backlog.

THE decline in tin plate is a seasonal trend. Sheet and strip business will be augmented shortly by orders from the automobile industry, which have already begun to appear in a small way. In the heavier products, particularly semi-finished steel, wire rods, structural shapes, plates, sheet piling, the trend of orders is upward.

Aggregate tonnage received by the mills in July was in most cases below that of June, yet July was easily the second best month of the year thus far. In some products July tonnage was better than that of June. While domestic business on the whole has perhaps stopped increasing for the time being, it has not declined from the level of the second week of July. Export buying has gained and the total of all business

• As production is pushed to the limit, shortages of raw steel, pig iron and coke begin to appear . . . Industry rate advances to new 1940 peak of 90½ per cent . . . Large steel inquiries from Japan follow licensing of scrap exports . . . Scrap composite unchanged.

is generally running ahead of shipments. British, Japanese and South American buying is more than making up for any leveling off in some domestic lines.

Japan has come to this market for more than 200,000 tons of semi-finished steel, wire rods, etc., which may be a result of the President's proclamation placing No. 1 heavy melting steel scrap under the licensing provision of the May-Sheppard Act. It is also believed that Japan may buy pig iron here if she is unable to obtain sufficient scrap. However, there is no ban on exports of No. 2 steel scrap, of which there is an abundant supply. The scrap decree takes effect at midnight July 31. Boats which are being loaded with scrap for Japan may complete their cargoes, for which permits have been assured even though clearance is not obtained until after the decree becomes effective.

THE scrap licensing proclamation has had no adverse effect on scrap prices. On the contrary, the decline in prices has apparently been checked, for the time being at least. THE IRON AGE scrap composite price, an average of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia, is unchanged for the first time in six weeks. It stands at \$18.17. At St. Louis, No. 1 steel is up \$1, chiefly as a result of a shortage caused by the heat.

National defense requirements are beginning to get on steel mill order books. This week they are noted principally in structural steel, sheet piling and reinforcing bars. Fabricated structural steel contracts are upward of 49,000 tons and include a good many defense projects, while 15,000 tons of reinforcing bar awards include 10,000 tons for Navy airplane hangars at Quonset Point, R. I. Most of the construction work results from \$200,000,000 worth of shore facilities for which fixed-fee contracts have been placed by the Navy Department. Housing projects totaling \$6,000,000 for these Navy bases have also been provided for.

The largest munitions contract is one of about \$25,000,000 placed with the National Tube Co., U. S. Steel subsidiary, for airplane bombs and projectiles. Seamless tubing will be used for making the bombs and deliveries will start in about a month. Other War Department contracts just placed total about \$10,000,000.

The Industrial Pace . . .

A SHARP drop in automobile assemblies as the industry went into its annual changeover period was largely responsible for the loss of 1.8 points shown by THE IRON AGE capital goods index for the week ended July 27. The week's assemblies, 34,822 units, were the lowest since the week of Sept. 16, 1939. A year ago production amounted to 46,329 and at the nadir of the 1939 changeover period production dropped to 12,955 units.

The steel series was virtually unchanged in the week, the gain in actual output being equal to the seasonal trend. The Pittsburgh series also showed practically no change for the week. The lumber carloadings component rose sharply in the week, probably a reflection of the intensified construction activity noted over the past few weeks. The gain in the lumber series pushed this index to a new high for the current year, with the likelihood that still further increases will be recorded as construction projects associated with national defense, awarded in recent weeks, get into the actual building stage.

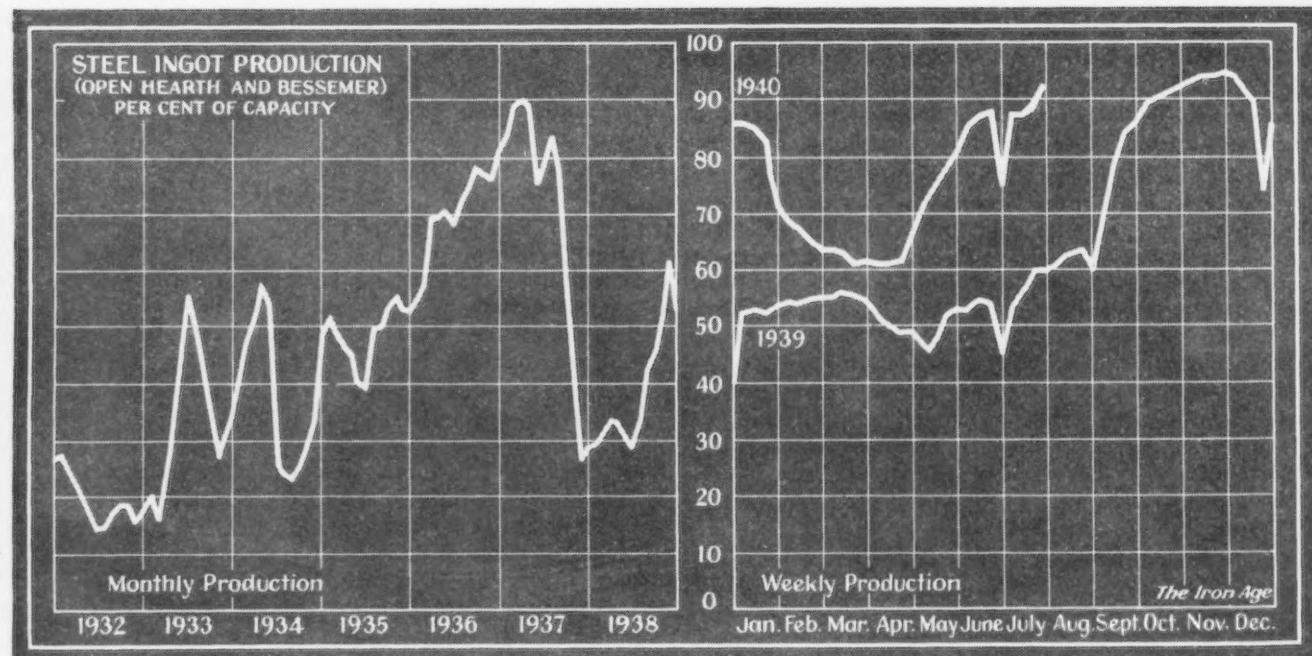
Engineering construction awards for the week, \$52,380,000, were 69 per cent below the record breaking level of the preceding week, but equal to the average of the past three months. While few of the larger projects awarded in the week were di-

rectly associated with the defense program, publicly financed work accounted for close to 75 per cent of the week's total.

Revenue freight carloadings thus far in July are, on a weekly basis, just about equal to the June average. The July total is below the June figure, as the accompanying graph indicates, due largely to the fact that there were five weeks' loadings in the June figure and only four in the July data. Since May, loadings this year have maintained a slight lead over the corresponding months of 1939, but are still substantially below the peak loadings of September and October of 1939.

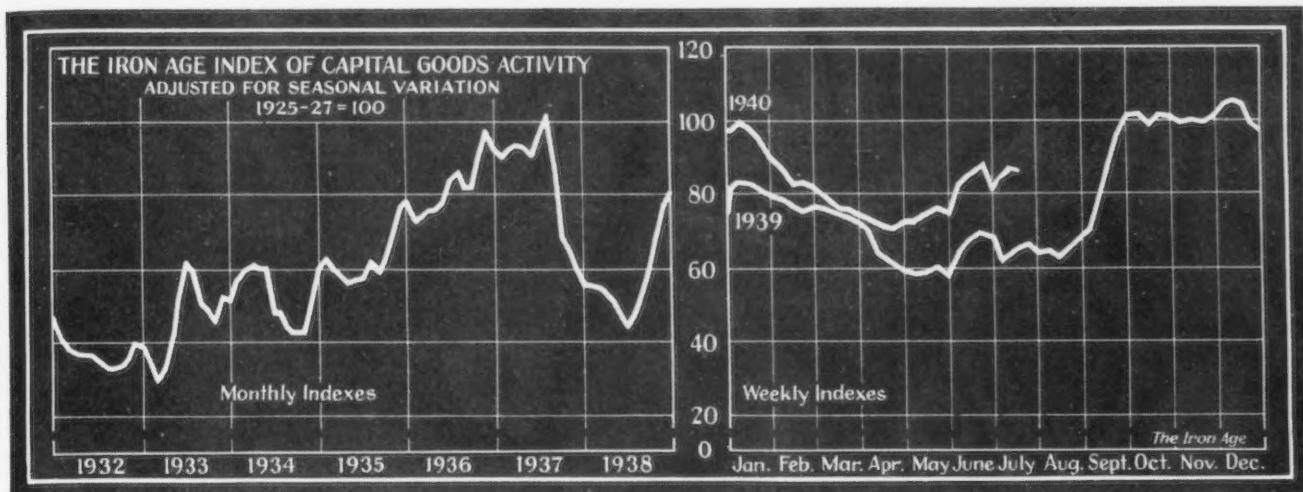
Scrap prices, despite the steadily increasing pace of steel mill operations, continued to decline in the first four weeks of July. This decline, which started shortly after Italy's entry into the war, has brought THE IRON AGE composite price, as the accompanying graph shows, down almost \$2 a ton in six weeks. While there are some indications that a resistance point may be established at present levels, the new licensing measure put into effect last week, seemingly intended to control shipments to Japan, may have a further weakening effect although it is too early to accurately discern what influence this measure may have on scrap prices.

Ingot Rate Rises One and One-Half Points to 90 1/2% of Capacity



District Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Philadel-	Cleve-	Wheel-	S. Ohio	West-	East-	Aggre-
Current Week	86.0	97.0	89.5	92.0	81.0	100.0	104.0	100.0	90.5
Previous Week	85.0	96.5	87.0	90.0	68.0	100.0	99.0	100.0	89.0

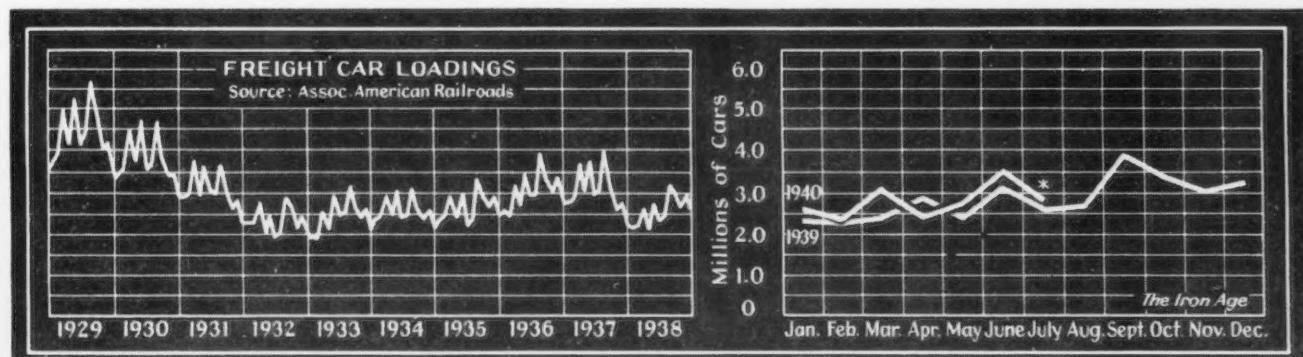
Automobile Mode Changeover Causes Loss in Index



▼ Component	Week Ended ▶ July 27	July 20	June 29	1939	July 29	July 27
Steel ingot production ¹	125.6	125.8	132.2	85.5	139.7	139.7
Automobile production ²	38.4	53.5	81.3	44.9	134.7	134.7
Construction contracts ³	83.6	82.9*	69.2*	67.7	123.4	123.4
Forest products carloadings ⁴	65.7	59.6	61.9	62.2	125.4	125.4
Pittsburgh output and shipments ⁵	108.4	108.7	105.4	75.1	130.0	130.0
COMBINED INDEX	84.3	86.1*	90.0*	71.1	130.6	130.6

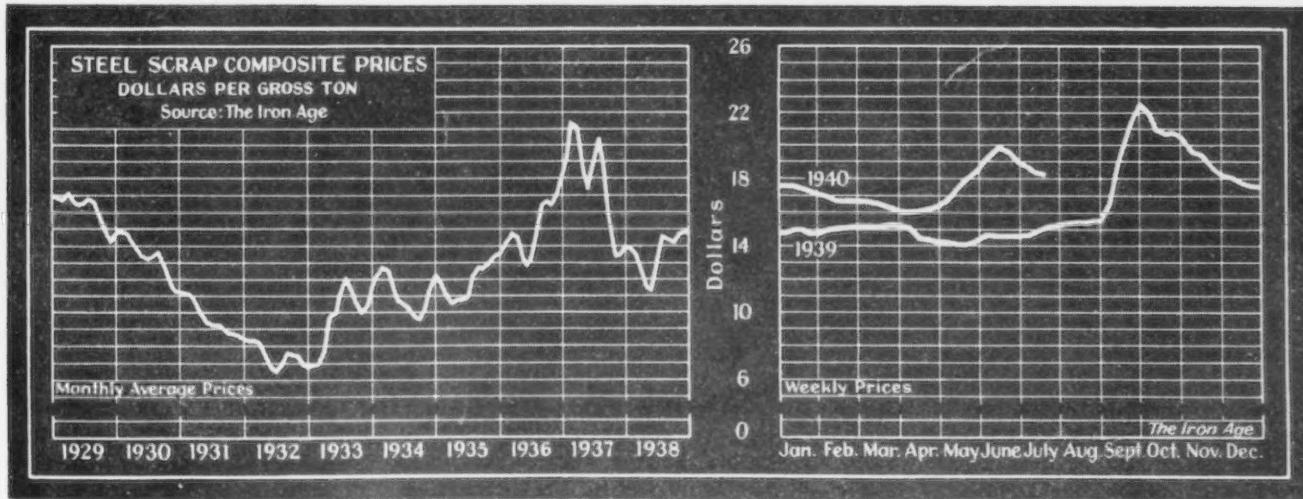
Sources: ¹ THE IRON AGE; ² Wards Automotive Reports; ³ Engineering News-Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended July 20. Other indexes cover week of July 27. *Revised.

July Carloadings, on Weekly Basis, Hold to June Levels



*July estimated on basis of three weeks' data.

Scrap Prices Drop Almost \$2 in Month and a Half



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

...Flow of orders generally in excess of production

With substantial export business, support from national defense projects increasing, and purely domestic demand about holding its own, total steel bookings at PITTSBURGH in the past week were in better volume than in the past three weeks. In many instances, incoming specifications were substantially in excess of practical capacity with the result that backlog were further enlarged.

Unfilled tonnage was also increased in the past week due to the inability of steel making and finishing departments to make estimated schedules because of the severe heat wave. Pipe and sheet requirements are not keeping pace with demand for other steel products, but support is looked for soon in the case of sheets from automotive centers. British, South American and Japanese buying is more than making up for any leveling off encountered in some domestic lines.

Bookings at CHICAGO are well maintained in volume and in some quarters are reported to be slightly improved in the past week. Outlook for continued peak operations is favorable, the district now being at a new 11-year high of 97 per cent this week. Plates, shapes, pilings, bars, and rails are the most active products. Only lag in buying is noted in automotive and refrigerator fields, but these interests are expected to be active shortly when new models go into production.

Export needs have been heavy, and defense program requirements are increasing. Mills, however, report that, while direct government buying has been heavy, no substantial volume has as yet been attained in indirect government work—that is, demand from interests making products for government use.

Structural and plate demand is in better prospect and recent gains have been noted. Plate fabricators and heavy machinery makers have

been particularly active. Alloy steel demand continues good, with bar demand heavy. Reinforcing steel demand is expanding.

At CLEVELAND aggregate steel orders for the month up to July 29 were just about equal to productive capacity and better than any previous July since 1929. The automotive industry is now past its low point between models, construction awards are at a new high led by government projects, and the British are continuing to buy heavily. Munitions awards in the next 30 days are expected to provide an outlet of considerable importance for makers of hot rolled and cold finished bars. Demand for electric furnace alloy steel and stainless steel is particularly strong.

Yet despite all the above points, CLEVELAND steel makers find their predictions for the fall must be qualified because of certain factors which can be appreciated readily, such as the effect of high inventories, the political questions, steps which might be taken or not taken by the Administration and the future course of world events.

The national defense program is slowly making itself felt in the PHILADELPHIA area. Primarily this effect is of a secondary nature and represents buying of equipment and maintenance supplies as well as actual production material by plants holding government contracts. Frankford Arsenal last week took bids on over 2,700,000 empty shells, including a large number of cast iron practice shells. Auto Specialties Co., St. Joseph, Mich., was apparent low bidder on 2,600,000 60 mm. shells and Budd Wheel Co. was the only bidder on 163,504 3-in. shells. Harrisburg Steel Corp. is pushing plans for expansion necessary to fulfill a \$1,961,832 contract for aerial bombs. Other district plants, active on defense contracts, have recently placed orders for moderate tonnages, but because of the special character of part of the required steel, large quantities have been placed with mills outside the EASTERN PENNSYLVANIA area. The accent of general sales in Philadel-

phia has shifted to the heavy steels. The increased demand for this type of material is in most cases more than making up for the slackening in sheet, strip and merchant bar sales. Most sellers report that new bookings are still in excess of shipments. Pennsylvania Railroad on Saturday issued formal releases for the first batch of material required for its new car program. Shipyards continue to contribute heavily to current business.

Pacific Coast business continues to be dominated by government defense construction with fabricators scrambling for this business. Pacific Coast fabricating facilities will reach 100 per cent capacity within a few weeks. Deliveries on most classifications from Eastern mills are subject to delays of several weeks, particularly plates, which have been subject to unusual demand by shipbuilders. Some contractors on large cost-plus defense projects are seeking blanket price commitments on classifications subject to the greatest fluctuation. Despite this extreme activity, the major requirements for defense construction still remain to be placed and still more concentrated demand appears inevitable in weeks to come. Further complicating the situation in California, \$60,000,000 of the current highway budget remains to be spent and reclamation buying on projects already under way is by no means completed.

Every coin has its obverse, however, and oil country demand undoubtedly will be slacker due to uncertainty over export markets. Oil companies with foreign interests face an uncertain future with regard to them.

Steel Operations

...Rate for industry rises point and half to 90½%

Notwithstanding slight losses in three districts, the ingot producing rate of the steel industry has gained a point and a half over last week to 90½ per cent. One district, Wheeling-Weirton, is operating at four points above its theo-

MARKET NEWS

retical capacity, while the Detroit district is operating at 100 per cent. Chicago has gained a half point to 97 per cent, making a new high for that district since 1929. Rates are also higher in some other districts, including Pittsburgh, which is up a point over last week to 86 per cent.

The three districts in which there have been losses are: The Birmingham district, where the Republic plant has taken off a 90-ton open-hearth for enlargement to 125-ton capacity; the Southern Ohio district, where an easing in the shipments of sheets and strip has required less raw steel, and in the St. Louis district, where a declining demand for tin plate is reflected in slightly lower operations.

If bessemer steel making capacity were employed as fully as open-hearth capacity, the steel industry rate would be even higher. The demand for bessemer converters are being utilized for the manufacture of so-called synthetic scrap.

Pig Iron

... Production heavy, particularly for steel making

Pig iron production at PITTSBURGH continues at a high rate with July shipments substantially above those in June. Large integrated steel mills are pushing furnaces to the utmost and, if the present high level of steel mill activity continues much longer, the program for enlarging present capacities will certainly be expedited.

CHICAGO pig iron shipments for July approximate those of June, and outlook for August is improved. Early indications are that August movement will exceed that of July due to expected increases in foundry melt, while shipments to nonintegrated steel mills will remain high in line with anticipated continuance of capacity operations.

The fact that July shipments of CLEVELAND producers were best of any month this year seems to have been caused more by demand for steel-making iron than any other single factor. Nevertheless, the foundry melt has been picking up during the past two weeks and foundry coke deliveries for the

month edged ahead of June. The British continue eager for low phosphorus pig iron. There is a possibility that Japan may be a heavier buyer if scrap iron shipments are suspended.

Outside of occasional fill-in lots calling for quick shipment, new business in PHILADELPHIA continues in very light volume. While the hot weather has served to reduce schedules in some plants, the expansion of operations in other directions has acted to keep the volume of shipments so far this month well up to June levels.

No. 2 blast furnace of Otis Steel Co., Cleveland, idle since May 6 when a remodeling program started, was scheduled to go into blast again July 31. Many blast furnace projects involving new stacks or repairs to present units, are being figured at the present time, including Canadian jobs.

Semi-Finished Steel

... Both export and domestic business in large volume

Substantial improvement in both domestic and export business was responsible for further gains in semi-finished bookings at PITTSBURGH. The British orders are not necessarily confined to billets but encompass the entire range of semi-finished steel products. Some mills are booked ahead for at least two months on their semi-finished steel production. Undoubtedly a direct result of the licensing of scrap export to Japan, that country is now in the market for approximately 110,000 tons of semi-finished steel for prompt shipment. The inquiry involves a like amount of ingots, slabs, billets, and about 20,000 tons of wire rods.

Railroad Buying

... 30 large steam locomotives ordered, only 85 cars

Chief activity in the railroad market in the past week centered on motive power equipment, with purchases of 30 large steam units reported. Freight car purchases amounted only to 85 cars.

Southern Pacific has purchased 20 locomotives from Lima Locomo-

tive Co., and Atchison, Topeka & Santa Fe has ordered 10 4-8-4 locomotives from Baldwin Locomotive Works. Union Pacific is contemplating buying 16 4-6-6-4 type units.

Louisville & Nashville has purchased 25 hopper cars from Pullman-Standard Car Mfg. Co., and Newburgh & South Shore has purchased 60 ore cars from the same car builder. Reading is expected to announce shortly a new car program, and Erie is understood to be contemplating the repair of several hundred cars.

Approval of \$2,700,000 in equipment trust certificates to finance in part the purchase of \$2,926,500 worth of railroad equipment is sought by the Mobile & Ohio Railroad in an application filed with the ICC. Equipment to be purchased included 1000 box cars of 40 tons to be built by American Car & Foundry Co., at a cost of \$2,036,000; 250 hopper cars of 50 tons, Pullman Standard Car Mfg. Co., \$540,500, and two diesel electric locomotives, American Locomotive Co., \$350,000.

Coke

... More beehive ovens are being put into service

• • • **Coke supplies** are becoming even more of a bottleneck than was the case a few weeks ago. In addition to the two major steel companies, which have been reaching for beehive coke supplies to supplement their by-product coke, another large steel company has joined the procession. This latter company has also put into operation a considerable number of old-time beehive ovens located at one of its plants, with plans already under way to bring in the remainder. The same company has made a sizable purchase of blast furnace scrap in order to increase the yield from blast furnaces in operation.

Many steel companies are stepping up sharply the amount of low volatile coal which ultimately gives them a greater pig iron yield but on the other hand cuts down the amount of by-products recovered during the coking process.

On June 14 approximately 1850 beehive coke ovens were in opera-

MARKET NEWS

tion in the Western Pennsylvania region while at the present time approximately 3300 are working. The peak in 1937 approximated 6000, but those ovens now idle are so badly in need of repairs that owners will not countenance rehabilitation and operation unless they obtain more for their beehive coke than the present market, which is quoted at \$4.25 to \$4.50 a

ton, f.o.b. Connellsville, for furnace beehive coke. The figure prominently mentioned as being enough to bring in the remaining ovens is around \$5.50 to \$6 or more a ton, which would be no small item of expense for steel mills which were forced to take material at this price. Such a set of circumstances, were they to come to pass, might affect the price of pig iron.

Bolts, Nuts and Rivets

... July one of the industry's best months

July became an exceedingly good month for bolt makers, having gone ahead of June in sales and running close to January and the busy months last fall. The contra-seasonal trend is particularly apparent as it pertains to the automotive industry. Some sellers express the belief that if demand continues so strong, quick deliveries will be hard to arrange despite the industry's large production capacity. All indications point to continued good order volume in the immediate future. Export markets are fairly active, including demand from the British. Prices are said to be firmer all along the line.

LIGHTER GAUGE STAMPINGS, too



The versatility of our men and machines is limited only by the needs of those who entrust to us the important task of producing their stampings.

In the instance illustrated, a Tank Rim for an electrical transformer— $16\frac{3}{4}$ " long, $18\frac{1}{8}$ " wide and $5\frac{1}{4}$ " deep—was stamped out of steel .075" thick. Yet each angle, arc, port and flange is clean and clear—and true to gauge.

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Wire Products

... Manufacturers' wire in good demand, merchant items dull

Domestic wire demand at PITTSBURGH is no better than a week ago but total orders have shown some improvement owing to increased export demand from England, Japan and some South American countries. Merchant products continue dull while manufacturers' wire demand is expected to pick up soon when automobile companies begin to specify.

CLEVELAND reports that demand for manufacturers' wire continues brisk, July being above normal in sales. Deliveries to diversified export markets are well maintained. Construction projects involving fence, wire rope and mesh have been an important factor during the past two months.

Though recent wire buying at CHICAGO has eased off slightly in volume, July business generally compared favorably with June's, and some large interests indicates an improvement. Automotive requirements are expected to increase substantially very shortly, though initial releases may be small. Demand from other sources has been quite well maintained. Agricultural implement and tractor requirements have been at a high level, while mesh for roadbuilding is in a good season.

MARKET NEWS

Tubular Goods

... National Tube bomb contract to take large tonnage of pipe

Oil country goods specifications at PITTSBURGH continue slow, but standard merchant pipe orders continue to climb. Line pipe business within the past few weeks has been better than a month ago, with some of this material being rushed to completion by steel makers in order that they may be in a better position to fulfill Government contracts.

Although the tonnage involved in the \$25,000,000 order for aerial bombs and projectiles placed with National Tube Co. by the Government was not stated, it is obvious that a tremendous tonnage of seamless tubing will be utilized in this project. It is understood that regular seamless practice is to be followed in making the bombs, with the final forming stages to be performed by spinning.

Electric weld tube makers at CLEVELAND report this summer is one of the most active of any similar period in years. Demand is well diversified. Merchant pipe sales are strong, due to sustained construction, particularly Government projects.

A total of 120,000 lineal feet of $\frac{1}{2}$ and $\frac{3}{4}$ in. O. D., $\frac{1}{4}$ in. wall thickness, electric welded steel pipe will be required for the substructure of a power plant at Venice, Ill.

Sheets and Strip

... Mills still have large backlog ... Automotive buying begins

Pittsburgh sheet makers expect substantial releases from automobile manufacturers within the near future. Production and shipment of hot rolled sheets continues at record levels, whereas activity in the cold mills does not compare as favorably with hot mill operations. Fresh business has shown little or no change recently, with individual orders small but numerous. Strip bookings are relatively larger than sheet requirements, this being due in part to governmental orders.

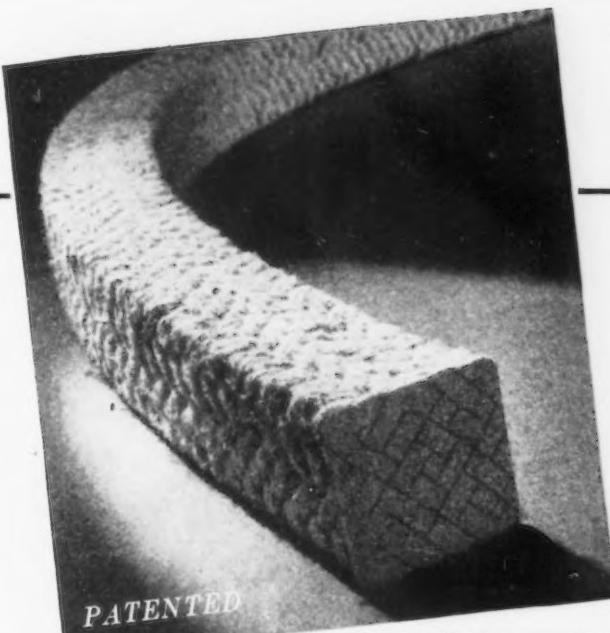
Mills in the CLEVELAND and YOUNGSTOWN areas continue heavily scheduled and shipments are edging upward toward a peak. The automotive industry is taking steel for 1941 models at an increasingly

stronger rate, indicating that the low point between models has been passed.

Backlogs of sheet and strip steel at CHICAGO mills are sizable and new buying while not reaching great proportions as yet, has been reasonably consistent. Decidedly more activity is seen for August as automotive and refrigerator makers' requirements increase. Heavier rolling of sheet and strip

for early runs of new 1941 model automobiles is getting under way in CHICAGO this week, large interests indicate.

In Southern Ohio new business is a trifle better than had been expected. Mills are still shipping on old contracts. Consumers extended themselves so heavily on low price steel that they now have no need for heavy buying until inventories are depleted.



GARLOCK LATTICE-BRAID Packing is available in the following styles: GARLOCK 730 for hot or cold water, caustic solutions or weak acids. GARLOCK 731 for steam, gas, acids, lye and caustic soda solutions. GARLOCK 732 for high pressure steam or hot oil. GARLOCK 736 for acids or strong chemical solutions. GARLOCK 751 for cold oil or water.

GARLOCK
Announces

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GARLOCK Patented LATTICE-BRAID Packings are braided *through and through*—in an entirely new and different way from ordinary braided packings.

All braided strands are lattice-linked into a structural unit, resulting in greater strength, longer life, semi-automatic action and unusual flexibility.

Special new machines enable us to make LATTICE-BRAID in a distinctive pattern which is *infinitely better and positively proven*.

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GARLOCK

Merchant Bars

... Automotive tonnage and orders for shell rounds expected soon

Total bar business at PITTSBURGH in the past week, including merchant, export, and governmental demand, was greater than in the week before. British orders were substantial. From here on it will

be difficult for steel mills to separate business ultimately destined for national defense and business for the ordinary trade channels as a large number of domestic consumers are producing both classifications. Meanwhile, bar backlogs are substantial and although deliveries on some sizes are fairly easy, small rounds and shapes such as angles cannot be had in less than from six to eight weeks. Further sup-

port to the bar market is expected in the next few weeks from automotive centers. Alloy demand continues at record levels, while cold finished bar requirements have been coming in at a volume favorably comparable with recent tonnages.

CLEVELAND reports that makers of small size hot rolled and cold finished bars foresee considerable activity in the next 30 days arising from anti-aircraft shell awards. Order backlogs for alloy bars are particularly heavy, especially where special heat treatment is desired. Delivery promises on small hot rolled bars have been growing longer.

Carbon bar demand at CHICAGO has proceeded at an easier level, aiding in some betterment in deliveries of certain sizes. Movement currently is sidewise in trend, though carbon bar volume remains definitely substantial.

Reinforcing Bars

... Bending extras are stabilized at levels higher than recently quoted

Bending extras for concrete reinforcing bars, after being all over the lot, have stabilized recently at 80c. a 100 lb. for light bending and 30c. a 100 lb. for heavy bending, which represents a net increase from recent going prices but which is a 10c. a 100 lb. reduction on the purely nominal extras which were announced last October. A minor change has been officially made in trucking extras: the 10c. a 100 lb. minimum extra is retained for hauling within the metropolitan or switching limits of New York, Pittsburgh, Youngstown, Buffalo, Chicago, Gary, Cleveland, Sparrows Point, and Birmingham, but all other points take a trucking extra of not less than 5c. a 100 lb.

Including several large sized government jobs which have not been let as yet, total pending reinforcing bar projects on which bids have already been made total upward of 120,000 tons. Concrete bar prices are relatively stable throughout the country at the full published price with the exception of the Southwest where some soft spots have developed.

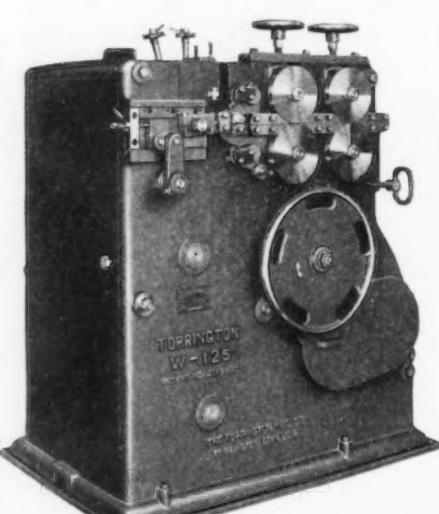
Reinforcing steel awards of 15,400 tons include 10,000 tons for Navy hangars at Quonset Point, R. I. New reinforcing steel projects total 6400 tons.

**... or PROFIT COLUMN?**

"Trojan Horse" tactics may be making treacherous and unsuspected inroads into your PROFIT column. Torrington Spring Machines will increase production per machine hour, reduce rejections by setting a new and higher standard of accuracy . . . increase your PROFITS!

Torrington Spring Machines are of extra-heavy, rigid construction . . . compact design . . . with easily adjusted and conveniently located controls. Timken bearings are used throughout. Springmakers everywhere are discovering that Torrington Spring Machines meet their every demand . . . exactly.

Investigate NOW what Torrington Spring Machines can do for YOU in stepping up production, accuracy . . . and PROFITS.



Spring Making Machines by
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THE TORRINGTON MANUFACTURING CO. of TORRINGTON, CONNECTICUT

MARKET NEWS

Structural Steel

... Fabricated awards at high level of 49,100 tons

With the exception of two weeks ago, fabricated structural steel awards at 49,100 tons are the highest since December, 1938. The largest lettings are 12,000 tons for a Naval Air Base at Corpus Christi, Tex.; 5700 tons for Atlantic Avenue improvements in Brooklyn for the Long Island Railroad; and 4000 tons for a power house at Venice, Ill.

New structural steel projects of 33,200 tons compare with 23,600 tons last week. Inquiries include 8000 tons at Hartford, Conn., for conduit for the Park River.

Plates

... Demand is increasing, especially for wider sizes

Plate specifications at PITTSBURGH continue to increase in volume. Deliveries, especially on wide plates, have been further extended. Wide plate sizes are being promised in seven to 10 weeks while some of the narrower widths can be obtained in much less time. The Inland Waterway will take bids Aug. 5 on 15 barges which will utilize approximately 10,000 tons of steel.

At CHICAGO, plates are among the most active of finished steel forms, causing considerable extension of delivery dates on many sizes, particularly the wider ones. New structural jobs and bridge work are prominent sources of demand, while requirements of general line fabricators, heavy machinery and equipment makers, and railroads continue at a high level. A sizable volume of government work, both direct and indirect, also is involved in the present market.

CLEVELAND reports that plate sales for July apparently were in close proximity to June order volume. Railroad car building has been a major source of support for the market.

Formal release of the first steel required by Pennsylvania Railroad for its new car program was made last Saturday. This material had previously been allocated and a large portion of it had been rolled, awaiting permission to ship. Full requirements of the car program will be spread over a period of time. While buying by the Reading for its car repair work is in small vol-

ume, a new car program is in preparation and may be announced shortly. The cars involved will probably be built in the road's own shops. Shipyard and miscellaneous demand in the PHILADELPHIA area continues fairly strong, but few EASTERN PENNSYLVANIA producers have much of a backlog beyond three weeks. Several are able to make shipments in 10 days to two weeks. Demand for floor plates has been especially heavy of late.

Tin Plate

... Operations decline further along with specifications

Fresh tin plate specifications have slowed up some in the past few weeks, although total volume of new business still reflects good demand. The export situation remains unchanged. Operations this week are estimated at 71 per cent, down two points from a week ago.

Blitzkrieg BARGAIN

SHEETS ORDERED FOR EXPORT
TO HOLLAND MANUFACTURED BY
THE LEADING PRODUCER.

Packed in two ton metal boxes,
waterproof paper lined, on wooden skids

COLD ROLLED STEEL SHEETS,
PRIMES ONLY, STAMPING QUALITY,
BRIGHT WHITE FINISH, EXTRA HEAVY OILED,
STRETCHER LEVELLED & RESQUARED

Pkgs	Sheets	Lbs.
2	559	.0364" x 33-15/32 x 33-15/32" 6350
10	2911	.0364" x 35-7/16 x 35-7/16" 38015
2	447	.0364" x 37-13/32 x 37-13/32" 6585
5	992	.0364" x 39-3/8 x 39-3/8" 15770
		66720

R. S. STOKVIS & SONS, INC.
17 BATTERY PLACE, NEW YORK
Phone Whitehall 4-4485

Machine Tools

...SALES, INQUIRIES AND MARKET NEWS

Large Volume Pending

Chicago

• • • Bookings are again on the increase, with some dealers reporting as much as a 20 per cent betterment, compared with a like period in June. A substantial amount of work is actively pending, while incoming inquiries continue unabated. The Government has been buying on a substantial scale, though activity in connection with the defense program is described as not even having scratched the surface of the market when compared with what is anticipated. Tentative orders from some industrial companies hinge on award of Government contracts, but closure on these is increasing.

Self-Regulation Sought

Cincinnati

• • • While no priority schedule has yet been set up, machine tool manufacturers report that pressure to favor armament manufacturers holding defense program orders is being exerted. On the whole, there seems to be a general feeling that the Government is not eager to set up a definite control or demand schedule for machine tool production, but prefers to have the industry itself regulate the matter by giving first place on production schedules to domestic armament needs. Locally, builders are respecting this desire, attempting to favor defense needs. At the present moment, this does not present a serious problem, because the volume of

orders for defense needs has not been great. On the other hand, inquiry continues to be very large.

Domestic Buying Jumps

Cleveland

July is closing strong here, due to heavy and diversified domestic buying. New business booked by producers will fall below June, which was the best month of this year on the domestic side, but orders recently have been coming in at twice the rate that prevailed during earlier months this year prior to June. All in all, there has been an increase in domestic business, including Canadian, sufficient to more than offset the drop in foreign demand. Aircraft requirements remain the leading source of business. Rapid progress has been made in producing or disposing of export orders.

At this writing the industry is expecting to receive almost momentarily a definite basis for voluntary priority. No drastic changes will be forced, however. Most machine tool builders have been accepting orders subject to the request of Government departments.

Orders and Inquiries High

New York

• • • Both orders and inquiries were again at a high level last week and the early part of this week. Leading sellers in this district estimated that orders are currently running three times the volume of shipments, despite the tendency to crowd shipments at the end of the month. Practically all incoming orders are related to the defense program. The question of priorities, handled so far informally, therefore, is largely an academic one in this area.

Following the announcement of a \$92,000,000 loan by the R.F.C. to the Wright Aeronautical Corp. for the erection of a plant near Cincinnati, preliminary inquiries for large quantities of machines, in batches as high as 50 to 100 were issued from Paterson early this week.

Select the Best STEEL for each TOOL

IN ONE QUICK GLANCE
WITH THE NEW CHART OF
**JESSOP TOOL STEEL
RECOMMENDATIONS**

FREE TO TOOL ROOM EXECUTIVES

"What tool steel to use" can now be decided in a matter of seconds . . . for the new chart of JESSOP TOOL STEEL RECOMMENDATIONS lists over 150 types of tools alphabetically in vertical columns, with recommended tool steels for each job indicated directly at the right. The illustration shows how easily it works.

The new chart also describes the recommended heat treatment for the outstanding brands of JESSOP Tool Steels. The chart can be hung on the wall of your tool room for quick reference. For your free copy write to the Jessop Steel Co., 537 Green St., Washington, Pa., using your company letterhead.

"JESSOP Sets Standards in Fine Quality STEELS"

Jessop Steels of America

CARBON- HIGH SPEED- SPECIAL ALLOY-
STAINLESS- and COMPOSITE STEELS



Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

New York, July 30—A generally better undertone was apparent in all non-ferrous markets in the past week, particularly in copper. A modest buying wave in copper got under way early in the week, reaching a climax over the weekend when 5277 tons were sold. For the month through Saturday sales total about 40,000 tons, or about 40 per cent of the June figure for the comparable period.

The improved consumer interest caused a strengthening in smelters' and small producers' quotations. Early in the week custom smelters were asking around 10.625c. a lb., delivered Valley, but today the asking price was close to 11c. Primary producers continue to hold to the 11.50c. level.

While there was a heavy demand for nearby metal, the total sales figure revealed a very wide distribution of delivery dates. Outside of Japanese buying, amounting to about 5000 tons for the week, the export market was very quiet. Prices on the Japanese material are understood to have ranged between 9.90c. and 9.95c. f.a.s.

Lead

Sales last week showed a modest improvement over the preceding week and on Monday of this week several sellers' bookings were in excess of their quotas. Today, however, demand slackened considerably and only an occasional carload of August was being sold. September books have been opened but consumers show little interest in that month. A light demand for July persisted throughout the past week, but bulk of sales was for August delivery, which month is now about 65 per cent covered. Quotations were unchanged all week at 5c. per lb., New York.

Zinc

The better undertone which developed generally in the non-ferrous markets last week was reflected in an increase in prime Western sales for the period to 11,314 tons from 8861 tons in the

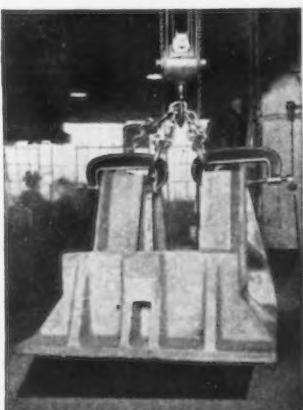
preceding week. Shipments remain fairly well stabilized at around 5000 tons a week. Despite the fact that most consumers are fairly well covered forward, it is felt that if the present firmness persists a while longer consumers will likely revise their conception of adequate backlogs and will attempt to extend stocks further at their plants. Prime western quotations remain unchanged at 6.64c. per lb., New York.

Tin

A steady demand persisted through the past week, with tin plate makers especially active. The sustained buying pushed prices above the 50c. limit of government buying and consequently forced the government to cease its

purchasing activities for the time being. At the start of the past week prices were in the neighborhood of 51.375c. a lb., New York, for straits tin, while this morning the metal was priced at 52.50c. World production of tin in the first half of this year is estimated at 102,900 tons by the International Tin Research and Development Council, as against 63,200 tons in the corresponding period of 1939. Consumption in United Kingdom in the six months ended June 30 totaled 15,740 tons, an increase of 52 per cent over the like period of 1939, while United States deliveries in the first six months of 1940 rose to 50,609 tons, a gain of 68½ per cent over the first half of 1939. World stocks of tin at the end of June were 41,211 tons.

(*Non-ferrous prices on page 103.*)



Because they never give, these ARMSTRONG Heavy Duty "C" Clamps are safely used, day after day, to carry these gigantic steel automobile body dies where the slightest spread or spring or the least slippage of the screw would result in disaster.

Here is dependable quality that you too can rely on. Look for the Arm-and-Hammer Trade Mark. It guarantees a better clamp.

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Drop Forged "C" Clamps



HEAVY DUTY "C" CLAMPS

Drop Forged from special steel, heat treated to give extra strength and stiffness. These stronger clamps have long hubs and alloy steel screws. Capacities from $\frac{3}{4}$ " to $1\frac{1}{2}$ ".

MEDIUM SERVICE "C" CLAMPS

A strong clamp adapted to general use, that gives maximum holding power consistent with convenient weight. Drop Forged, heat treated body. Special steel screw with free acting swivel. Capacities from 2" to 18".

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A light, strong clamp, fast operating. Ideal for general shop use, for assembling, holding airplanes, automobiles, boats, etc. Forged, heat treated body, special steel screw. Capacities 2" to 12".

DEEP THROAT "C" CLAMP

This clamp is designed with an extra deep throat to give maximum clearance required by body builders, woodworkers, welders, etc.

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Drop Forged and heat treated to increase toughness. Screws are also drop forged, have square neck to take wrench and come plain or with swivel end.

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Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

• • • Transactions last week and the early part of this week were at the lowest level in many months, but the fact that mills are consuming scrap at a high rate and operations continue to advance has apparently halted the declining trend in scrap values. As a result of unchanged quotations for No. 1 steel at Pittsburgh, Chicago and Philadelphia, the composite remains at \$18.17 after falling for five weeks from the early summer high of \$19.92 of June 18. No changes in quoted prices are recorded at Detroit, Cleveland, Youngstown, Birmingham, Cincinnati and New York. Buffalo prices are down 50c. on the principal grades, although no significant mill buying has taken place. At St. Louis, hot weather has restricted the supply from the country, and No. 1 is up \$1 along with some other advances, but for some items dealers are offering lower prices.

Pittsburgh

Scrap transactions in the past week were almost at a standstill and the market continues to lack clarification with more activity expected soon. No. 1 heavy melting continues quotable at \$18 to \$19 a ton, unchanged from a week ago. Mixed borings and turnings and cast iron borings have strengthened considerably on the basis of a sale into consumption at \$13 a ton. For the first time in a great number of years low phosphorus billet crops are quotably lower than railroad specialties, the latter being in great demand because of existing shortages and heavy demand from steel foundries.

Chicago

Activity has been confined chiefly to dealer-broker trading as no new mill purchases have been confirmed and foundry purchasing is restricted. Despite lack of consumer buying the market has shown a firmer tendency. A leading consumer is reported interested in further purchasing of No. 1 heavy melting steel at \$17.50 but brokers have higher prices in mind as it is now necessary to pay \$17.25 and \$17.50 to dealers for this grade. Most scrap values, though slightly firmer, showed no substantial change in the past week.

Philadelphia

For the second consecutive week, prices here on steel-making grades remain unchanged. Early last week it appeared that negotiations being conducted by several mills might come to a head, but announcement of the Presidential decree licensing exports of No. 1 steel caused further postponement of buying action. While at first a bearish interpretation was placed on the proclamation by interests here, further study

has given rise to the belief there will be no immediate reaction. As a matter of fact, prices being paid to dealers on export orders are higher now than they were before the announcement. The high rate of mill operations and generally low status of both mill and dealer stocks, coupled with the fact that prices have not changed in two weeks, causes many traders here to feel that the bottom of the decline has been reached.

Youngstown

At the start of this week the market here was stagnant. Fresh mill buying has not developed on any scale worthy of mention. Shipments against old orders are proceeding at a number of points. Prices remain nominal and unchanged. Open-hearth operations are maintained at a high rate but one major producer is using less scrap per heat than ever before.

Cleveland

The mill buying which some expected had not developed here up to early this week and the entire market was simply standing still. Meanwhile, district ingot production has regained its former level of before the vacation at Lorain, vessel shipments of scrap are fairly brisk and rail shipments against old orders are drawing to a close.

Buffalo

Licensing of scrap exports, it is felt, will have little if any repercussion on the local market since very little scrap has been exported here, except to Canada, and only a small percentage of this has been No. 1 heavy melting steel. Though No. 1 heavy melting has been marked down 50c. to \$18 to \$18.50, little business is being transacted within this price range, dealers report.

St. Louis

With temperatures at around 100 deg., preventing the handling of scrap iron, shipments from the country to St. Louis have been halted, and operations in yards are virtually at a standstill. This has resulted in higher prices for some grades, No. 1 heavy melting steel being raised \$1. A few other items are down from 25c. to \$1. Some buying is expected from the mills later in the week. Railroad lists: Baltimore & Ohio, 6000 tons; Chicago, Milwaukee & St. Paul, 1800 tons.

Birmingham

While possible embargo on scrap iron going to Japan is expected to further depress an already weakened scrap market in the Birmingham district, prices remain unchanged in the absence of buying. Republic Steel Corp., largest district consumer, is still out of the market and when it will reenter is problematical.

Cincinnati

While the government licensing on scrap metal export caused a flurry of excitement locally, dealers generally do not expect it to effect this market very substantially. If exports are completely

shut off, the amount of back-tracking scrap to this area is not expected to be great, because of excessive freight rates. Currently, although the activity is not brisk, dealers bids are unchanged for the first time in the past month. Mills generally are resisting any forward price movement.

Detroit

Evidences of somewhat improved sentiment are becoming apparent in the scrap market in this area, although dealer buying prices are unchanged, awaiting more definite signs of support. There are anticipations of mill buying in the next month and some No. 2 bundles are now moving to Ford Motor Co. This material is understood to be taken in trade for scrap produced at branch plants. Country mixed scrap is coming into Detroit in profusion, and for some yards has more than offset recent declines in plant scrap. Plant lists closing at the end of July indicate, however, that scrap production will increase in August over July.

New York

The first test on the licensing restrictions on No. 1 steel will not arise until Aug. 1. Meanwhile, it is understood that boats that were loading for Japan when the new proclamation was made last Friday will be allowed to complete their cargoes, including No. 1 steel. Japan has not been getting large percentages of No. 1, and local Japanese buying houses are apparently prepared to take out unshipped tonnages in No. 2, old bundles and cast grades, should No. 1 be banned. This factor has already strengthened No. 2 steel, of which there had been a superabundance of late compared with the usual ratios of No. 1 shipped abroad. Dealer buying price for No. 1 is firm and unchanged at \$15 in truck lots.

Boston

Last week a cargo left Providence for Japan and another boat is loading there. In the meantime, shipments are going to England irregularly. Exporters are still out of the market for scrap, having previously covered requirements. Continued weakness of No. 1 heavy melting steel in Pittsburgh has had little influence here on the general scrap market, although Nos. 1 and 2 steel at local yards is 25c. a ton lower, and a Weirton consumer has dropped its price for steel turnings, for which brokers are paying \$7.15 to \$7.88 a ton on cars, as against as high as \$8.15 a week ago.

Toronto

Consumers continue to show keen interest in the market and demand for both steel and iron materials is brisk. Some delay in third quarter booking has developed pending negotiations between dealers and consumers for higher prices. To meet increasing demands from Ontario meltters supplies are being drawn from Montreal, Winnipeg and also from the United States. Local dealers report curtailment in offerings from holders in this area, but state they have not run into any actual shortage.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.00 to \$19.00
Railroad heavy mltng.	19.00 to 20.00
No. 2 heavy melting...	17.00 to 17.50
Railroad scrap rails...	20.50 to 21.00
Rails 3 ft. and under...	22.50 to 23.00
Comp. sheet steel....	18.00 to 19.00
Hand bundled sheets...	17.00 to 18.00
Heavy steel axle turn...	17.00 to 17.50
Machine shop turnings...	13.50 to 14.00
Short shov. turnings...	15.50 to 16.00
Mixed bor. & turn....	12.50 to 13.00
Cast iron borings....	12.50 to 13.00
Cast iron carwheels...	20.00 to 20.50
Heavy breakable cast...	16.00 to 16.50
No. 1 cupola cast....	19.50 to 20.00
RR. knuckles & coup...	24.50 to 25.00
Rail coil springs....	24.50 to 25.00
Rail leaf springs....	24.50 to 25.00
Rolled steel wheels...	24.50 to 25.00
Low phos. billet crops...	23.00 to 23.50
Low phos. punchings...	25.00 to 26.00
Low phos. heavy plate...	23.00 to 23.50
Railroad malleable ...	23.50 to 24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
No. 2 hvy. mltng. steel.	17.00 to 17.50
Hydraulic bund., new...	18.50 to 19.00
Hydraulic bund., old...	15.50 to 16.00
Steel rails for rolling...	22.00 to 22.50
Cast iron carwheels...	20.50 to 21.00
Hvy. breakable cast...	19.00 to 19.50
No. 1 cupola cast....	21.00 to 21.50
Mixed yard (f'd'y) cast...	18.00
Stove plate (steel wks.)	15.00 to 15.50
Railroad malleable ...	22.50 to 23.00
Machine shop turn....	12.50 to 13.00
No. 1 blast furnace...	11.50 to 12.00
Cast borings....	11.50 to 12.00
Heavy axle turnings...	16.50 to 17.00
No. 1 low phos. hvy...	24.00 to 24.50
Couplers & knuckles...	24.00 to 24.50
Rolled steel wheels...	24.00 to 24.50
Steel axles...	23.50 to 24.00
Shafting...	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
Cast borings (chem.)...	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton

Hvy. mltng. steel....	\$17.00 to \$17.50
Auto. hvy. mltng. steel alloy free.....	16.25 to 16.50
No. 2 auto steel....	13.75 to 14.25
Shoveling steel....	17.00 to 17.50
Factory bundles...	16.75 to 17.00
Dealers' bundles...	15.25 to 15.50
No. 1 busheling....	16.25 to 16.50
No. 2 busheling, old...	8.00 to 8.50
Rolled carwheels...	20.50 to 21.00
Railroad tires, cut...	21.00 to 21.50
Railroad leaf springs...	18.50 to 19.00
Steel coup. & knuckles...	20.50 to 21.00
Axle turnings...	16.25 to 16.75
Coil springs...	22.00 to 22.50
Axle turn. (elec.)...	17.75 to 18.25
Low phos. punchings...	20.50 to 21.00
Low phos. plates 12 in. and under.....	20.50 to 21.00
Cast iron borings....	10.50 to 11.00
Short shov. turn...	11.50 to 12.00
Machine shop turn....	11.50 to 12.00
Rerolling rails...	21.50 to 22.00
Steel rails under 3 ft...	19.75 to 20.25
Steel rails under 2 ft...	21.00 to 21.50
Angle bars steel....	20.00 to 20.50
Cast iron carwheels...	18.75 to 19.25
Railroad malleable ...	22.00 to 22.50
Agric. malleable	14.75 to 15.25

Per Net Ton

Iron car axles...	23.50 to 24.00
Steel car axles...	22.00 to 22.50
Locomotive tires...	15.00 to 15.50
Pipes and flues...	11.50 to 12.00
No. 1 machinery cast...	16.50 to 17.00
Clean auto. blocks...	17.25 to 17.75
No. 1 railroad cast...	15.00 to 15.50
No. 1 agric. cast...	13.50 to 14.00
Stove plate...	10.75 to 11.25
Grate bars...	12.50 to 13.00
Brake shoes...	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
No. 2 hvy. mltng. steel.	17.50 to 18.00
Low phos. plate...	20.50 to 21.00
No. 1 busheling...	17.75 to 18.25
Hydraulic bundles...	18.00 to 18.50
Machine shop turn...	13.00 to 13.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
No. 2 hvy. mltng. steel.	17.00 to 17.50

Comb. sheet steel....	\$17.50 to \$18.00
Light bund. stampings...	14.50 to 15.00
Drop forge flashings...	17.00 to 17.50
Machine shop turn...	11.50 to 12.00
Short shov. turn...	12.00 to 12.50
No. 1 busheling...	17.25 to 17.75
Steel axle turnings...	17.00 to 17.50
Low phos. billet and bloom crops...	23.00 to 23.50
Cast iron borings...	12.00 to 12.50
Mixed bor. & turn...	12.00 to 12.50
No. 2 busheling...	12.00 to 12.50
No. 1 cupola cast...	20.50 to 21.00
Railroad grate bars...	14.00 to 14.50
Stove plate...	14.00 to 14.50
Rails under 3 ft...	23.00 to 23.50
Rails for rolling...	23.00 to 23.50
Railroad malleable ...	21.50 to 22.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
No. 2 hvy. mltng. steel.	16.00 to 16.50
Scrap rails...	20.50 to 21.00
New hvy. b'ndled sheets	16.00 to 16.50
Old hydraul. bundles...	14.50 to 15.00
Drop forge flashings...	16.00 to 16.50
No. 1 busheling...	16.00 to 16.50
Machine shop turn...	11.00 to 11.50
Shov. turnings...	13.00 to 13.50
Mixed bor. & turn...	11.50 to 12.00
Cast iron borings...	11.50 to 12.00
Knuckles & couplers...	22.00 to 22.50
Coil & leaf springs...	22.00 to 22.50
Rolled steel wheels...	22.00 to 22.50
No. 1 machinery cast...	19.50 to 20.00
Stove plate...	15.50 to 16.00
Steel rails under 3 ft...	23.50 to 24.00
Cast iron carwheels...	18.00 to 19.00
Railroad malleable ...	22.00 to 23.00

ST. LOUIS

**Dealers' buying prices per gross ton
delivered to consumer:**

Selected hvy. melting...	\$15.50 to \$16.50
No. 1 hvy. melting...	15.00 to 15.50
No. 2 hvy. melting...	14.00 to 14.50
No. 1 locomotive tires...	17.50 to 18.00
Misc. stand. sec. rails...	17.50 to 18.00
Railroad springs...	18.00 to 18.50
Bundled sheets...	10.50 to 11.00
Cast bor. & turn...	8.00 to 8.50
Machine shop turn...	8.00 to 8.50
Heavy turnings...	11.25 to 11.75
Rails for rolling...	19.50 to 20.00
Steel car axles...	21.00 to 21.50
No. 1 RR. wrought...	11.50 to 12.00
No. 2 RR. wrought...	14.00 to 14.50
Steel rails under 3 ft...	20.75 to 21.25
Steel angle bars...	17.25 to 17.75
Cast iron carwheels...	16.50 to 17.00
No. 1 machinery cast...	18.50 to 19.00
Railroad malleable ...	18.50 to 19.00
Breakable cast...	15.25 to 15.75
Stove plate...	11.50 to 12.00
Grate bars...	12.00 to 12.50
Brake shoes...	12.50 to 13.00

CINCINNATI

**Dealers' buying prices per gross ton
at yards:**

No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Scrap rails for mltng...	19.50 to 20.00
Loose sheet clippings...	8.75 to 9.25
Hydraul. b'ndled sheets	13.25 to 13.75
Cast iron borings...	5.50 to 6.00
Machine shop turn...	6.50 to 7.00
No. 1 busheling...	10.00 to 10.50
No. 2 busheling...	4.25 to 4.75
Rails for rolling...	21.00 to 21.50
No. 1 locomotive tires...	15.50 to 16.00
Short rails...	21.50 to 22.00
Cast iron carwheels...	15.50 to 16.00
No. 1 machinery cast...	18.00 to 18.50
No. 1 railroad cast...	16.50 to 17.00
Burnt cast...	10.00 to 10.50
Stove plate...	10.00 to 10.50
Agric. malleable...	14.50 to 15.00
Railroad malleable ...	17.50 to 18.00
Mixed hvy. cast...	15.25 to 15.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$16.50
No. 2 hvy. melting steel	15.50
No. 1 busheling	14.00
Scrap steel rails	15.00
Steel rails under 3 ft...	17.50
Long turnings...	5.00
Cast iron borings...	7.50
Stove plate...	11.00
Steel axles	18.00
No. 1 RR wrought	14.00
No. 1 cast	16.00
No. 2 cast	12.50
Cast iron carwheels	12.00
Steel car wheels	16.00

DETROIT

**Dealers' buying prices per gross ton,
f.o.b. cars:**

No. 1 heavy melting...	\$14.00 to \$14.50
No. 2 heavy melting...	13.00 to 13.50
Borings and turnings...	9.50 to 10.00
Long turnings...	9.00 to 9.50
Short shov. turnings...	10.00 to 10.50
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast	15.00 to 15.50
Stove plate	11.50 to 12.00
Hydraul. Comp. sheets	16.00 to 16.50
New busheling	14.50 to 15.00
Sheet clips	13.00 to 13.50
Flashings	14.00 to 14.50
Low phos. plate	17.00 to 17.50

NEW YORK

**Dealers' buying prices per gross ton
on cars:**

No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	12.50 to 13.00
Hvy. breakable cast...	15.00 to 15.50
No. 1 machinery cast	17.00 to 17.50

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings in large volume at 49,100 tons; new projects higher at 33,200 tons against 23,600 tons last week; plate awards call for 1210 tons.

AWARDS

NORTH ATLANTIC STATES

- 5700 Tons, Brooklyn, Atlantic Avenue improvement, sections three and four, for Long Island Railroad Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 2040 Tons, New York, bulb angle curbing, to Phoenix Bridge Co., Phoenixville, Pa.
- 1100 Tons, Quonset Point, R. I., Navy seaplane hangars, to Bethlehem Steel Co., Bethlehem, Pa.
- 625 Tons, West Lynn, Mass., extensions and additions for General Electric Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 600 Tons, Rochester, N. Y., Bausch & Lomb plant addition, to F. L. Heughes & Co., Rochester, N. Y.
- 560 Tons, Clearfield, Pa., State highway bridge, to American Bridge Co., Pittsburgh.
- 440 Tons, Brooklyn, Belt Parkway bridge contract E-1, for Triboro Bridge Authority, to American Bridge Co., Pittsburgh.
- 300 Tons, Mansfield, Pa., Tioga River State bridge, to Fort Pitt Bridge Works Co., Pittsburgh.
- 290 Tons, Buffalo, store building, Hotel Statler, Inc., to Ernst Iron Works, Buffalo.
- 285 Tons, New York, St. Gabriel's Roman Catholic School, to Schacht Steel Construction Co., New York.
- 295 Tons, Dundalk, Md., barrel racks, to International Steel Co., Evansville, Ind.
- 260 Tons, Palmyra, N. Y., plant addition for Garlock Packing Co., to F. L. Heughes & Co., Rochester, N. Y.
- 255 Tons, Aberdeen, Md., shop building, ordnance school, to Belmont Iron Works, Philadelphia.
- 250 Tons, Dover Plains, N. Y., State bridge RC-40-59-60, to Bethlehem Steel Co., Bethlehem, Pa.
- 230 Tons, Addison, N. Y., State bridge RC-40-51, to American Bridge Co., Pittsburgh.
- 200 Tons, Bayway, N. J., crude oil heater units for Standard Oil Co., to Pittsburgh Bridge & Iron Co., Pittsburgh, through Arthur G. McKee & Co., Cleveland.
- 175 Tons, Niagara Falls, N. Y., DuPont laboratory, to Ernst Iron Works, Buffalo; Laur & Mack, Niagara Falls, N. Y., general contractors.
- 170 Tons, Bethlehem, Pa., soaking pit furnace, to Lehigh Structural Steel Co., Allentown, Pa.
- 150 Tons, S. Windsor, Conn., Scantic River State bridge, to American Bridge Co., Pittsburgh.
- 145 Tons, Greenwich, Conn., residence for Henry Sears, to White Plains Iron

Works, White Plains, N. Y.
140 Tons, Ellwood City, Pa., plant extension for Aetna Standard Engineering Co., to Truscon Steel Co., Youngstown.

140 Tons, Mineola-Roslyn, Long Island, bridge, to American Bridge Co., Pittsburgh.

125 Tons, New York, pedestrian bridge and recreation building, to Belmont Iron Works, Philadelphia.

125 Tons, Westport, Conn., bridge, to American Bridge Co., Pittsburgh.

125 Tons, Chester, Pa., St. Robert's Catholic Church, to Belmont Iron Works, Philadelphia.

125 Tons, Providence, R. I., Merchant & Miners Transportation Co., sheds, etc., to a Baltimore fabricator.

120 Tons, Chemung County, N. Y., State highway bridge, to American Bridge Co., Pittsburgh.

100 Tons, Buffalo, Buffalo Foundry & Machine Co. plant addition, to R. S. Mannus Steel Construction Co., Buffalo.

THE SOUTH

12,000 Tons, Corpus Christi, Tex., Naval air base, divided among Ingalls Iron Works Co., Birmingham; Mosher Steel Co., Dallas, Tex.; Virginia Bridge Co., Roanoke, Va., and Bethlehem Steel Co., Bethlehem, Pa.

2900 Tons, Jacksonville, Fla., hangars for Naval air station, to Steel Construction Co., Birmingham.

1500 Tons, Jacksonville, Fla., extension to A & R shop building and aircraft storehouse, to Jones & Laughlin Steel Corp., Pittsburgh.

1500 Tons, Harrayat, Ga., addition to steam generating plant, Georgia Power Co., to Ingalls Iron Works Co., Birmingham.

1200 Tons, Miami, Fla., three double land plane hangars, to Virginia Bridge Co., Roanoke, Va.

620 Tons, West Salem, N. C., hospital and medical school, to Carolina Steel & Iron Co., Charlotte, N. C.

615 Tons, Pickwick Dam, Tenn., TVA power house, to Milwaukee Bridge Co., Milwaukee.

445 Tons, Mitchell, Kaufman and Lee Counties, Tex., to North Texas Iron & Steel Co., Fort Worth, Tex.

440 Tons, Kentucky Dam, Ky., intake towers for TVA, to Hunter Steel Co., Pittsburgh.

400 Tons, Green Cove Springs, Fla., double hangar, to Virginia Bridge Co., Roanoke, Va.

330 Tons, Dahlgren, Va., Navy land plane hangar and powder magazine, to Fort Pitt Bridge Works Co., Pittsburgh.

300 Tons, Mount Pleasant, Tenn., addition to furnace building, Victor Chemical Works, to Ingalls Iron Works Co., Birmingham.

235 Tons, Bracey, Va., Seaboard Airlines Railway Co., deck plate girder bridge, to Virginia Bridge Co., Roanoke, Va.

145 Tons, Wheeler Dam, Ala., trash racks for TVA, to Treadwell Construction Co., Midland, Pa.

115 Tons, Greenville, S. C., alteration, Poinsett Hotel, to Southern Engineering Co., Charlotte, N. C.

115 Tons, Arlington, Va., bridge overpass, National Airport, to American Bridge Co., Pittsburgh.

CENTRAL STATES

4000 Tons, Venice, Ill., power house for Union Electric Co. of Illinois, to Stupp Brothers Bridge & Iron Co., St. Louis, through Stone & Webster Construction Co., Boston.

1200 Tons, Franklin Park, Ill., State bridge to Midland Structural Steel Co., Cicero, Ill.

1100 Tons, Peoria, Ill., building addition for Caterpillar Tractor Co., to Joseph T. Ryerson & Son, Inc., Chicago.

460 Tons, Evanston, Ill., technical institute for Northwestern University, to Bethlehem Steel Co., Bethlehem, Pa.

450 Tons, Detroit, addition to Briggs factory, to Whitehead & Kales Co., Detroit.

425 Tons, Chicago, Lincoln Park bridge, to Bethlehem Steel Co., Bethlehem, Pa.

350 Tons, Mississippi River Locks 16, 18, 20 and 21, guide wall extensions, to Mississippi Valley Structural Steel Co., St. Louis.

235 Tons, Wausau, Wis., Employers Mutual Insurance Co. building, to Wausau Iron Works, Wausau, Wis.

130 Tons, Evansville, Ind., factory building for Sunbeam Electric Co., to International Steel & Iron Co., Evansville, Ind.

120 Tons, Vernon County, Wis., bridge SP-5690, to A. C. Woods & Co., Rockport, Ill.

120 Tons, Cleveland, office building for Arthur G. McKee & Co., to Fort Pitt Bridge Works Co., Pittsburgh.

115 Tons, States of Illinois and Iowa, 13 beam spans, Chicago Great Western Railway Co., to American Bridge Co., Pittsburgh.

115 Tons, Various locations, bridges for Milwaukee Road, to Milwaukee Bridge Co., Milwaukee.

WESTERN STATES

1650 Tons, Ogden, Utah, Hill Field, depot supply building, to Kansas City Structural Steel Co., Kansas City, Kan., previously reported to Bethlehem Steel Co.

500 Tons, Los Angeles, buildings for Vega Aircraft Co., to Apex Steel Co., Los Angeles.

420 Tons, El Segundo, Cal., Douglas Aircraft Co. plant addition, to Bethlehem Steel Co., Los Angeles.

345 Tons, Pueblo, Colo., boiler room, Public Utility Engineering & Service Corp., to Muskogee Iron Works, Muskogee, Okla.

284 Tons, Sappho, Wash., Soleduck River bridges, to Pacific Car & Foundry Co., Seattle, through Maeri Brothers and L. Coluccio, Seattle, contractors.

250 Tons, Alameda, Cal., Naval Air Station work, to Bethlehem Steel Co., through Johnson, Drake & Piper, Oakland, Cal., contractors.

225 Tons, Minturn, Colo., overpass on State highways 78 and 4 between Minturn and Wolcott, to Kansas City Structural Steel Co., Kansas City, Kan., through Larson Construction Co., Denver, contractor.

200 Tons, Los Angeles, manufacturing building for Harville Co., to Pacific Iron & Steel Co., Los Angeles.

Weekly Bookings of Construction Steel

Week Ended	July 30,	July 23,	July 2,	Aug. 1	Year to Date	
	1940	1940	1940	1939	1940	1939
Fabricated structural steel awards	49,100	29,925	11,750	25,150	532,980	582,325
Fabricated plate awards	1,210	3,450	1,765	4,130	87,615	99,140
Steel sheet piling awards	1,630	0	2,190	270	27,655	41,925
Reinforcing bar awards	15,400	12,225	6,800	8,450	267,535	288,050
Total Letting of Construction Steel	67,340	45,600	22,505	38,000	915,785	1,011,440

160 Tons, Redding, Cal., superstructure, Fenner Ferry bridge, for Government, to Moore Dry Dock Co., Oakland, Cal.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 8000 Tons**, Hartford, Conn., Park River conduit.
1250 Tons, Hartford, Conn., river dike; previously reported as 800 tons.
730 Tons, Brooklyn, scrap metal plant for Navy.
720 Tons, New York, Battery Tunnel shafts, for New York City Tunnel Authority; bids Aug. 2.
685 Tons, Schaghticoke, N. Y., highway bridge, project F.A.S.H. 40-2.
550 Tons, Plattsburgh, N. Y., highway project F.A.R.C. 40-66; Louis Longhi & Son, Torrington, Conn., general contractors.
440 Tons, Passaic, N. J., manufacturing building for Continental Can Co.
430 Tons, Carlisle Barracks, Pa., medical school building for U. S. Govt.
400 Tons, Portsmouth, N. H., extension inside machine shop for Navy.
320 Tons, Erie, Pa., factory and office building for Johnson Metal Products Co.; Henry Shenk, Erie, Pa., general contractors.
250 Tons, Greenhaven, N. Y., State building No. 11.
240 Tons, New York, Marginal Street bridge over Pennsylvania Railroad.
230 Tons, Bainbridge, N. Y., building for Borden Milk Co.
261 Tons, Dunkirk, N. Y., railroad crossing elimination, project P.S.C. 5934.
200 Tons, Somerset, Mass., power house addition.
175 Tons, Schenectady, N. Y., recreational building for Backer Bros.
160 Tons, Newark, N. Y., warehouse, for Jackson & Perkins.
150 Tons, Bethel, Me., field house for Gould Academy.
150 Tons, Philadelphia, exchange platform and crane runway for Gulf Oil Corp.
130 Tons, Avon, N. Y., highway bridge, project F.A.R.C. 40-68.

THE SOUTH

- 220 Tons**, Norfolk, Va., extension to machine shop No. 171, for Navy.
340 Tons, Jackson, Miss., building for General Electric Co.; W. T. Reed Construction Co., contractor.
750 Tons, Power, W. Va., power house for West Penn Power Co.

CENTRAL STATES

- 220 Tons**, Granville, Ohio, building for Denison University.
185 Tons, Ashtabula, Ohio, State project No. 199; bids Aug. 9 (also 55 tons reinforcing steel).
120 Tons, Dayton, Ohio, factory building for Apex Machine & Tool Co.
120 Tons, Caledonia, Wis., State bridge No. 259.

WESTERN STATES

- 4000 Tons**, Pacific Ocean islands, Naval construction; Raymond Concrete Pile Co., Turner Construction Co., Hawaiian Dredging Co.; J. H. Pomeroy Co., and Morrison-Knudsen Co., joint contractors.
2000 Tons, Los Angeles, Palomar sports and amusement center.
400 Tons, San Diego, Cal., Marine Corps base buildings; Los Angeles Construction Co. and O. W. Karn, Los Angeles, joint contractors.
360 Tons, Malta, Mont., bridge No. 469 for Great Northern Railway.
240 Tons, Heber, Utah, Duschesne Tunnel supports (Specification 926); bids Aug. 21.

CANAL ZONE

- 8000 Tons**, airplane hangar and shop buildings.

FABRICATED PLATES

AWARDS

- 840 Tons**, Wilmington, Del., four welded deck type sand and gravel barges for Warner Co., Philadelphia, to Dravo Corp., Pittsburgh.
244 Tons, South Ogden, Utah, fabricated 12-gage 4 to 12-in. pipe (Specification 1377-D), to Southern Pipe & Casing Co., Azusa, Cal.
125 Tons, San Francisco, pressure vessels, to Western Pipe & Steel Co., San Francisco.

PENDING PROJECTS

- 120,000 Ft.**, Venice, Ill., electric welded steel pipe for Union Electric Co. of Illinois; Western Foundation Co., Chicago, general contractor.
10,000 Tons, St. Louis, 15 barges for Inland Waterways Co.

130 Tons, Azusa, Cal., Morris Reservoir connection pipe line for Los Angeles Metropolitan Water District (Specification 337); bids July 31.

SHEET PILING AWARDS

- 730 Tons**, Chicago, Fullerton Parkway grade separation, to Inland Steel Co., Chicago.
550 Tons, Chicago, Fullerton Parkway grade separation, to Bethlehem Steel Co., Bethlehem, Pa.
250 Tons, Corning, N. Y., flood prevention project; Cleverock, Inc., New York, general contractor, to Carnegie-Illinois Steel Corp., Pittsburgh.
100 Tons, Chicago, lagoon outlets, to Inland Steel Co., Chicago.

PENDING PROJECTS

- 334 Tons**, North Portland, Ore., United States Engineer Invitation 698-41-38; bids Aug. 1.

Reinforcing Steel

Awards of 15,400 tons; 6400 tons in new projects

AWARDS

- ATLANTIC STATES**
10,000 Tons, Quonset Point, R. I., Naval hangars to Jones & Laughlin Steel Corp., New York.
375 Tons, Chicopee Falls, Mass., five hangars, to Truscon Steel Co., Youngstown.
154 Tons, Bristol Hill, N. H., road and bridge to Concrete Steel Co., Boston, through Littleton Construction Co., Littleton, N. H., contractor.
150 Tons, Reading, Pa., power plant for Metropolitan Edison Co., to Truscon Steel Co., Youngstown, through L. H. Focht & Sons.
150 Tons, Providence, R. I., hospital addition, to Truscon Steel Co., Providence.
150 Tons, mesh, Chicopee, Mass., Government hangars, to Concrete Steel Co., Boston.
100 Tons, New York, grade separation, Hutchinson Parkway to Capitol Steel Corp., New York.
100 Tons, Springfield, Mass., Monsanto Chemical Co. factory, to Truscon Steel Co., Youngstown, through J. G. Roy & Sons.
100 Tons, Washington County, N. Y., highway project FAS-SH-40-1, to Republic Steel Corp., Cleveland, through Albany Steel & Iron Supply Co.

SOUTH AND CENTRAL

- 825 Tons**, Atlanta, Ga., Alonzo Hearndon housing project, to Truscon Steel Co., Youngstown, through Beers Construction Co.
575 Tons, Waveland, Ark., Blue Mountain Dam, to Truscon Steel Co., Youngstown, through John Kerns Construction Co.
310 Tons, Cleveland, State bridge at Clifton, Lake and Bulkley Boulevards, to Carnegie-Illinois Steel Corp., through Lombardo Bros. Construction Co., Cleveland.
246 Tons, Coryell County, Tex., highway work, to North Texas Steel & Iron Co., Fort Worth, Tex.
200 Tons, Kaufman, Lee and Hamilton Counties, Tex., to North Texas Iron & Steel Co., Fort Worth, Tex.
199 Tons, Champaign-Urbana, Ill., men's dormitory, University of Illinois, to Joseph T. Ryerson & Son, Inc., Chicago.
150 Tons, Dayton, Ohio, airplane repair deck at Patterson Field, to Truscon Steel Co., Youngstown, through Skilken Bros. Co.
140 Tons, Blackhawk and Crawford Counties, Iowa, culverts, to Pittsburgh Des Moines Steel Co., Pittsburgh.
140 Tons, Indianapolis, Standard Grocery Co. building, to Truscon Steel Co., Youngstown.
120 Tons, Arlington County, Va., Mount Vernon Memorial highway bridge, to Bethlehem Steel Co., Bethlehem, Pa., through Diamond Construction Co., contractor.

- 110 Tons**, Dayton, Ohio, engine test building, Patterson Field, to Truscon Steel Co., Youngstown, through Charles A. Shook, Inc.
110 Tons, Warren County, Ohio, State project No. 163, to Truscon Steel Co., Youngstown, through DeSalvo Construction Co.

WESTERN STATES

- 200 Tons**, Los Angeles, Palomar sports and amusement center, to Soule Steel Co., Los Angeles.
180 Tons, Seattle, Swift & Co. terminal warehouse, to Bethlehem Steel Co., Seattle.
153 Tons, Zillah, Wash., Yakima project (Invitation A-53592-A), to Bethlehem Steel Co., San Francisco.

120 Tons, Vancouver, Wash., storage elevator, to Truscon Steel Co., Portland, Ore., through George Buckler Co., Portland, Ore., contractor.

104 Tons, Sappho, Wash., Soleduck River bridges, to Bethlehem Steel Co., Seattle, through Macri Brothers and L. Coluccio, Seattle, contractors.

CANAL ZONE

200 Tons, Panama Canal schedule No. 4164, to Taylor-Davis, Inc., Philadelphia.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 1000 Tons**, New York, extensions to shipways No. 1, Brooklyn Navy Yard; J. Rich Steers, contractor.
750 Tons, Newark, N. J., Felix Fulz housing project; Fatzler Co., Inc., Newark, low bidder.
300 Tons, Wilmington, Del., Du Pont office building addition; Turner Construction Co., contractor.
275 Tons, East Schuyler, N. Y., highway project F.A.R.C. 40-72.
200 Tons, Greenhaven, N. Y., prison, bids Aug. 1.
155 Tons, Schaghticoke, N. Y., highway project F.A.S.H. 40-2.
126 Tons, Mercer County, Pa., highway project R-238; bids Aug. 2.
100 Tons, Bound Brook, N. J., Bakelite Corp. building; bids taken.
100 Tons, Avon N. Y., highway project F.A.R.C. 40-68.

SOUTH AND CENTRAL

- 2000 Tons**, Venice, Ill., power station for Union Electric Co. of Illinois.
210 Tons, Chicago, subway station, section S-10C; bids Aug. 8.
200 Tons, Louisville, Ky., Coca Cola Bottling Co. plant; bids taken.
200 Tons, Appleton, Wis., County Court House; W. C. Smith, contractor.

WESTERN STATES

- 129 Tons**, Orange, Cal., State bridge.

CANAL ZONE

628 Tons, Panama Canal schedule No. 4202; bids Aug. 1.

Cast Iron Pipe

Lynn, Mass., has awarded a tonnage of 10-in. pipe to Warren Foundry & Pipe Corp., Boston.

Fall River, Mass., city auditor's office, is taking bids on class 200 24-in. pipe.

Danbury, Conn., will shortly ask bids on a sizable tonnage of pipe for water system extensions, to cost approximately \$140,000.

Department of Public Utilities, City Hall, St. Louis, E. E. Wall, director, plans early call for bids for new 12-in. main feeder line from point near Kingshighway Boulevard and Loughborough Avenue to city hospital, Koch district, about nine miles, for water supply for institution. Cost close to \$240,000. J. B. Dean, City Hall, is water commissioner.

Arena, Wis., plans pipe lines for water system and other waterworks installation. Financing is being arranged through Federal aid. General Engineering Co., Portage, Wis., is consulting engineer.

Agua Dulce, Tex., closes bids Aug. 3 for 8 and 6-in. pipe for water system; also for 50,000-gal. elevated steel tank and tower, motor-driven pumping machinery, fire hydrants and accessory equipment. M. C. St. John, 401 Polk Avenue, Houston, Tex., is consulting engineer.

Weatherford, Tex., plans pipe lines for water system and other waterworks installation. Cost about \$350,000. Bond issue in that amount has been approved. Albert C. Moore & Co., Smith-Young Tower Building, San Antonio, Tex., are consulting engineers.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., plans pipe lines for water system in districts Nos. 1601 and 1626, recently created.

Chattanooga, Tenn., plans water pipe line system in Chattanooga Valley district and other waterworks installation, including meters and service facilities. I. L. Knox is chairman of committee of city council to organize new water district in area noted. J. B. McCrary Co., Atlanta, Ga., is consulting engineer.

Board of Public Affairs, Gloucester, Ohio, plans pipe line extensions and replacements in water system, including new 200,000-gal. reservoir, work to begin early in September. Cost close to \$35,000.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

↓ Product	Basing Point →	DELIVERED TO																
		Pitts-	burgh	Chi-	ca-	Gary	Clev-	Birm-	Buffalo	Youngs-	Spar-	Granite	Middle-	Gulf	Pacific	Detroit	New	Philadel-
							land	ham	al	town	rrows	City	town,	Ports,	Ports,		York	phia
SHEETS																		
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢	
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢			3.05¢	3.05¢			3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢	
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢		
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢				3.35¢			3.45¢	3.35¢		4.00¢	3.45¢	3.71¢		
Long ternes ²	3.80¢		3.80¢											4.55¢				
Wrought iron	4.75¢																	
STRIP																		
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢				2.10¢			2.75¢	2.20¢			
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Wor-	cester =	3.00¢)					2.90¢			
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢											
Commodity C-R	2.95¢			2.95¢			2.95¢	(Wor-	cester =	3.35¢)					3.05¢			
TIN PLATE																		
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00								\$5.10							
BLACK PLATE																		
20 gage ⁵	3.05¢	3.05¢	3.05¢								3.15¢			4.05¢	(10)			
TERNES, M'FG																		
Special coated (Per base box)	\$4.30		\$4.30								\$4.40							
BARS																		
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	(Du-	luth = 2.	2.25¢)	2.50¢	2.80¢	2.25¢	2.49¢	2.47¢			
Rail steel ⁶	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.70¢						
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.50¢	2.55¢	2.25¢					
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢			2.40¢	2.45¢	2.15¢					
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢					
PLATES																		
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)	2.45¢	2.65¢		2.29¢	2.15¢			
Wrought iron	3.80¢																	
Floor plates	3.35¢	3.35¢										3.70¢	4.00¢		3.71¢			
SHAPES																		
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.10¢	(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢			
SPRING STEEL C-R																		
0.26 to 0.50 Carbon	2.80¢				2.80¢			(Wor-	cester = 3.00¢)									
0.51 to 0.75 Carbon	4.30¢				4.30¢			(Wor-	cester = 4.50¢)									
0.76 to 1.00 Carbon	6.15¢				6.15¢			(Wor-	cester = 6.35¢)									
1.01 to 1.25 Carbon	8.35¢				8.35¢			(Wor-	cester = 8.55¢)									
WIRE⁹																		
Bright	2.60¢	2.60¢			2.60¢	2.60¢												
Galvanized	2.60¢	2.60¢			2.60¢	2.60¢												
Spring	3.20¢	3.20¢			3.20¢	3.20¢												
PILING																		
Steel sheet	2.40¢	2.40¢					2.40¢						2.85¢	2.95¢				
IRON BARS																		
Common		2.25¢					(Terra	Haute,	Ind. = 2.15¢)									
Refined	3.75¢																	
Wrought	4.40¢																	

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 20 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling	\$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton

3 in to 8 in.....	\$54.00
8 in. to 12 in.....	52.00
12 in to 18 in.....	54.00
18 in. and over.....	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer.....	\$34.00
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Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared.	1.90c.
---------------------------------	--------

Wire Rods

(No. 5 to 9/32 in.) *Per Lb.*

Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., \$3 a net ton high-
er. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

20x14 in. 20x28 in.

8-lb. coating I.C...	\$6.00	\$12.00
15-lb. coating I.C...	7.00	14.00
20-lb. coating I.C...	7.50	15.00
25-lb. coating I.C...	8.00	16.00
30-lb. coating I.C...	8.63	17.25
40-lb. coating I.C...	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
---------------------------	--------

Base Column

Woven wire fence*.....	67
Fence posts (carloads).....	69
Single loop bale ties.....	56
Galvanized barbed wire†.....	70
Twisted barbless wire.....	70

*15 1/2 gage and heavier. †On 80-rod
spools in carload quantities.

Note: Birmingham base same on above
items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham
or Chicago)

Per Cent Off List

Machine and carriage bolts:

1/2 in. and 6 in. and smaller....	68 1/2
Larger and longer up to 1 in....	66
1 1/8 in. and larger.....	64
Lag bolts	66

Plow bolts, Nos. 1, 2, 3, and 7....	68 1/2
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
1/2 in. and smaller.....	67
9/16 in. to 1 in. inclusive.....	64
1 1/8 in. to 1 1/2 in. inclusive.....	62
1 5/8 in. and larger.....	60

On above items, excepting plow bolts,
additional allowance of 10 per cent for
full container quantities.

On all of the above items there is an
additional 5 per cent allowance for car-
load shipments.

Semi-fin, hexagon nuts U.S.S. S.A.E.	
1/2 in. and smaller.....	67
9/16 to 1 in.....	64
1 1/8 in. through 1 1/2 in..	62
1 5/8 in. and larger.....	60

In full container lots, 10 per cent
additional discount.

Stove bolts, packages, nuts loose

75 and 10

Stove bolts in packages, with nuts
attached

75

Stove bolts in bulk.....

83 1/2

On stove bolts freight allowed up to 65c.
per 100 lb. based on Cleveland, Chicago,
New York, lots of 200 lb. or over.

Large Rivets

(1/2 in. and larger)

Base per 100 Lb.	
F.o.b. Pittsburgh, Cleveland, Chi- cago, Birmingham	\$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List	
F.o.b. Pittsburgh, Cleveland, Chi- cago, Birmingham .....	.65 and 10

Cap and Set Screws

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller.....	50 and 10
Milled headless set screws, cut thread 1/4 in. and larger.....	64
3/16 in. and smaller.....	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb.
based on Cleveland, Chicago or New York
on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	July 24	July 25	July 26	July 27	July 29	July 30
Copper, Electrolytic ¹	11.50	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	51.375	51.50	51.625	52.00	52.50	
Zinc, East St. Louis ²	6.25	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis ³	4.85	4.85	4.85	4.85	4.85	4.85

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct 1/4c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New	Cleve-				
Straits pig	53.25	56.50				
Copper						
Lake	13.25	12.625				
Electro	12.75	12.625				
Castings	12.375	12.375				
H. R. sheets*.....	20.12	20.12				
Seamless tubes*	20.62	20.62				
Brass						
Yellow, sheets*	18.56	18.56				
Yellow, rods*	13.55	13.55				
Seamless tubes*	21.31	21.31				
Zinc						
Slabs	7.60	7.75				
Sheets, No. 9 casks..	12.00	12.00				
Lead						
American pig	6.10	5.50				
Bar	8.05	8.25				
Cut sheets.....	8.25	8.25				
Antimony						
Asiatic	16.00	17.00				
Aluminum						
Virgin, 99%	20.50	21.50				
No. 1 remelt., 98-99% 18.00	18.50					
Solder						
1/2 and 1/2	32.125	32.50				
Babbitt						
Anti-friction grade..	22.25	22.00				

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 19c.-20c. a lb.; No. 12 remelt. No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$190-\$193 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5, 11.50c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3%; on brass sheets and rods, 40%; on brass tubes, 33 1/3%, and copper tubes, 40%.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade 2.70c.
Delivered, Detroit 2.80c.

S.A.E. Alloy
Series Differential,
Numbers per 100 Lb.
2000 (1.5 Ni) \$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo) ..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo) ..	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni) ..	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'trip 17.00c.	17.50c.	24.00c.	35.00c.	
C'd st. 22.00c.	22.50c.	32.00c.	52.00c.	

TOOL STEEL

(F.o.b. Pittsburgh)

Base per Lb.

High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

Base per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago ..	\$54.80
6-in. and larger, del'd New York ..	52.20
6-in. and larger, Birmingham ..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle ..	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

350 SIZES

carried
in Stock

**JOHNSON
UNIVERSAL
BRONZE BARS**

● Save time and money . . . avoid delay by specifying Johnson UNIVERSAL Bronze. With over 350 sizes to choose from you can order exactly according to your needs. Conveniently located stocks permit shipment the same day your order is received.

Every bar is completely machined—I.D.—O.D. and Ends. This saves you 25% in purchased weight over rough bronze. Then too, you know in advance that every bar is usable—from end to end. Every bar is cast in S.A.E. 64—Copper 80%—Tin 10%—Lead 10%.

For real service, depend entirely on Johnson UNIVERSAL Bronze.

SOLD THROUGH INDUSTRIAL SUPPLY DISTRIBUTORS

JOHNSON BRONZE
Sleeve BEARING HEADQUARTERS
505 S. MILL STREET • NEW CASTLE, PA.

PRICES

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Weld,	Lap Weld,	Cold Hot	Hot	Drawn Rolled	Rolled
1 in. o.d.13 B.W.G.	\$9.01	\$7.82	....		
1½ in. o.d.13 B.W.G.	10.67	9.26	....		
1½ in. o.d.13 B.W.G.	11.70	10.23	\$9.72			
1¾ in. o.d.13 B.W.G.	13.42	11.64	11.06			
2 in. o.d.13 B.W.G.	15.03	13.04	12.38			
2½ in. o.d.13 B.W.G.	16.76	14.54	13.79			
2½ in. o.d.12 B.W.G.	18.45	16.01	15.16			
2½ in. o.d.12 B.W.G.	20.21	17.54	16.58			
2¾ in. o.d.12 B.W.G.	21.42	18.59	17.54			
3 in. o.d.12 B.W.G.	22.48	19.50	18.35			
3½ in. o.d.11 B.W.G.	28.37	24.62	23.15			
4 in. o.d.10 B.W.G.	35.20	30.54	28.66			
4½ in. o.d.10 B.W.G.	43.04	37.35	35.22			
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25			
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14			

Extras for less carload quantities:

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.....	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=\$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
½ in.	56	36
¾ to ⅔ in.	59	48½
⅔ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¾ and ⅔ in.	+9	+30
⅔ in.	24	6½
⅔ in.	30	13
1 and 1½ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel	Black	Galv.
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57½
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54

Wrought Iron	Black	Galv.
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

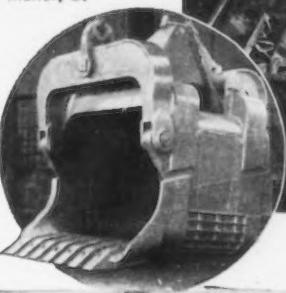
Butt weld, extra strong, plain ends			Black	Galv.
Steel	Black	Galv.		
½ in.	54½	41½		
¾ to ⅔ in.	56½	45½		
⅔ in.	61½	53½		
¾ in.	65½	57½		
1 to 3 in.	67	60		

Wrought Iron			Black	Galv.
¼ and ⅔ in.	+10	+43		
⅔ in.	25	9		
¾ in.	31	15		
1 to 2 in.	38	22½		

Lap weld, extra strong, plain ends		
Steel	Black	Galv.
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59

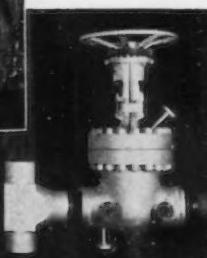
On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

35 cu. yd. Man-Ten steel dipper welded with Murex Carbon-Moly by Marion Steam Shovel Co. Marion, O.



Murex-welded shell and turbine connector built by Ross Heater & Mfg. Co. Buffalo.

High pressure piping welded with Murex Carbon-Moly by Geo. C. Limbert & Co., Chicago.



SPEED UP YOUR WELDING OF HIGH STRENGTH—LOW ALLOYS WITH

MUREX
ELECTRODES

SPECIALLY DESIGNED FOR CARBON-MOLY, COR-TEN, MAYARI, CROMANSIL, 2%-3% NICKEL AND OTHER STEELS

• The Murex line includes a group of specially developed rods designed to produce welds with tensile strengths ranging from 70,000 to 100,000 lbs. per sq. in.; ductilities of 20% to 30% and corrosion and heat resisting qualities matching closely any of the more widely used new steels. Because of their excellent deposition rates at high amperages, their ease of handling by skilled welders, and the assurance they provide of cleaner, smoother deposits they step up welding speeds and help hold down costs.

Ask to have Murex Electrodes demonstrated on your high strength-low alloy applications. A note to the nearest M & T office will bring a representative promptly.

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

Albany • Chicago • Cincinnati • Detroit • Minneapolis • Pittsburgh
So. San Francisco • Toronto

Thermit "Murex Electrodes—Thermit Welding—Thermit Metal & Alloys"

Investigate Thermit Welding, too—in use since 1902 for heavy repair work; crankshafts, housings, frames, etc.

Accumulator built of A. S. T. M. A-203, Grade B steel by Black, Sivalls & Bryson, Oklahoma City. Welded with Murex Nickel Steel.



THE IRON AGE, August 1, 1940-105

PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%	\$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%	4.35

*Foreign Ores**

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe.	12c.
--	------

Caucasian, washed, 52% Mn.....	60c.
African, Indian, 44 to 48% Mn.....	50c.
African, Indian, 49 to 51% Mn.....	55c.
Brazilian, 46 to 48% Mn.....	53c.
Cuban, del'd, duty free, 51% Mn	72c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....	\$23.50
Tungsten, domestic scheelite, delivered	23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)....Nom.	
Rhodesian, 45%	\$23.50
Rhodesian, 48%	27.50

ALWAYS ON CALL



Blast furnace unit at Wisconsin Steel Works

Wisconsin Steel Company is always ready to handle your pig iron orders promptly. The orders may be large or small; they may be urgent or routine. But of this you may be sure: you will like the efficient way Wisconsin Steel fills your orders.

If you are a regular customer, you have come to appreciate the uniform, dependable quality of Wisconsin Pig Iron. If you have never used our product, we urge you to get acquainted with it.

Manufacturers of quality castings in every line of business are finding that it meets their needs exactly.

We suggest that you try Wisconsin Pig Iron soon. It is "Better Controlled from Mine to Mold." The skill and experience of practical foundrymen and trained metallurgists stand behind every pig. The result is a product that is uniform and true, through and through. Inquiries will receive prompt attention.

WISCONSIN STEEL COMPANY

General Offices:

180 North Michigan Avenue

Affiliate of International Harvester Company

Chicago, Illinois

WISCONSIN STEEL

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.....	2.70
<i>F.o.b. Basing Points</i>	
Light rails (from billets), gross ton	\$40.00
Light rails (from rail steel), gross ton	39.00
<i>Base per Lb.</i>	
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads.....	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts).....	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail.....	\$20.00
Domestic, f.o.b. Ohio River landing barges	20.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines.....\$20.50 to 21.00	
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid....\$25.00 to \$25.50	
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....\$31.00	
As above, in bags, f.o.b. same mines	\$32.60

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis ..	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey.....	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois.....	42.75
Second quality, New Jersey....	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton.....	7.10

Silica Brick

Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50

Silica cement, net ton (Eastern) 8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester....	\$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	\$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....(—)*	
Domestic, f.o.b. Baltimore and Chester in sacks	\$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00
Domestic, 26 to 28%.....49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....\$74.50*
50% (ton lots, packed).....87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....\$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional.
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio
5.00 to 5.50%.....\$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%. \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon17.50c.
1% carbon18.50c.
0.10% carbon20.50c.
0.06% carbon21.00c.

Spot prices are 1/4c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*
2.50% carbon118.00*
2% carbon123.00*
1% carbon133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload.....\$2.00
Ferrotungsten, 100 lb. and less2.25

Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferracolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N.Y., ton lots\$2.25†

Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....\$142.50

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18% with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton\$58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville\$75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace.....95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N.J.4.75c.
No. 6, f.o.b. Bayonne, N.J.3.21c.
No. 5 Bur. Stds., del'd Chicago ..3.25c.
No. 6 Bur. Stds., del'd Chicago ..2.75c.
No. 3 distillate, del'd Cleveland ..5.25c.
No. 4 industrial, del'd Cleveland ..5.00c.
No. 5 industrial, del'd Cleveland ..3.75c.
No. 6 industrial, del'd Cleveland ..3.25c.

GET the hoist with every **worthwhile** feature

A—Bolt Suspension Type.
B—Plain Trolley Type.
C—Hand-Geared Type.
D—Motor Driven Trolley Type.
E—Cab-Controlled Type.

CAPACITIES FROM $\frac{1}{4}$ TO 12 TONS

A-E-CO
LO-HED
Time-tested
HOISTS

When you buy an electric hoist you want all the *worthwhile* features a hoist should have. Here is the way to get them: specify LO-HED. Lo-Hed construction includes *every* feature that the test of time has proved desirable. A-E-CO engineers have successfully resisted every temptation to add gadgets which would only have provided mere "talking points" or "improvements" which would not better performance, life, efficiency, or maintenance. Note in the open-view of the Lo-Hed

Hoist the logical arrangement of the hook between the drum and motor for minimum headroom. And these time-tested features: heavy duty hoist type motor, automatic lowering brake, anti-friction bearings, stub tooth spur gears, plow-steel cable, 100% positive automatic upper limit stop, dust and moisture-proof controller. (Construction varies slightly for classes of Lo-Heds.) • Investigate Lo-Hed time-tested construction. Write today for the complete Lo-Hed Catalog, shown below.

AMERICAN ENGINEERING COMPANY

2410 Aramingo Avenue, Phila., Pa.

OTHER A-E-CO PRODUCTS:
TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

Look in your classified telephone directory under "A-E-CO LO-HED HOISTS" for your nearest representative.

MAIL THIS COUPON NOW

RECO LO-HED HOISTS

AMERICAN ENGINEERING COMPANY

Please send me your 26 page complete catalog of Lo-Hed Hoists.

Ask your representative to call.

Name _____

Company _____

Street Address _____

City _____ State _____

(Please print plainly)

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$4.25 to \$4.50
Foundry, f.o.b. Connellsville, prompt	\$5.25 to 5.50
F'dry, by-product, Chicago	10.50
F'dry, by-product, New England	12.50
Foundry, by-product, Newark or Jersey City	\$11.30 to \$11.90
F'dry, by-product, Philadelphia	11.13
F'dry, by-product, Cleveland	11.05
F'dry, by-product, Cincinnati	10.50
Foundry, Birmingham	7.50
F'dry, by-product, St. Louis	\$10.75 to \$11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	\$14.75

BRITISH

British

*Per Gross Ton, f.o.b. United Kingdom
Ports*

Ferromanganese, export.	£17 18s.
Tin plate, per base box	32s. to 33s.
Steel bars, open hearth	£13 9s.
Beams, open hearth	£12 2s. 6d.
Channels, open hearth	£12 2s. 6d.
Angles, open hearth	£12 2s. 6d.
Black sheets, No. 24 gage	
£18 17s. 6d. max.*; £18 17s. 6d. min.**	

Galvanized sheets, No. 24 gage	£19 10s. max.*; £19 10s. min.**
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*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	\$24.50	\$24.00	\$25.50	\$25.00	.....
Brooklyn	26.50	.....	.....	27.00	.....
Jersey City	25.53	25.03	26.53	26.03	.....
Philadelphia	24.84	24.34	25.84	25.34	.....
Bethlehem, Pa.	\$24.00	\$23.50	\$25.00	\$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	23.44	23.61	.....	24.11	.....
Canton, Ohio	24.39	23.89	24.89	24.39	.....
Mansfield, Ohio	24.94	24.44	25.44	24.94	.....
St. Louis	23.50	23.02	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	23.50	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	25.63	.....	26.13	25.63	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	27.50	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fee.....\$22.50

CHARCOAL

Lake Superior fee.....\$27.00

Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

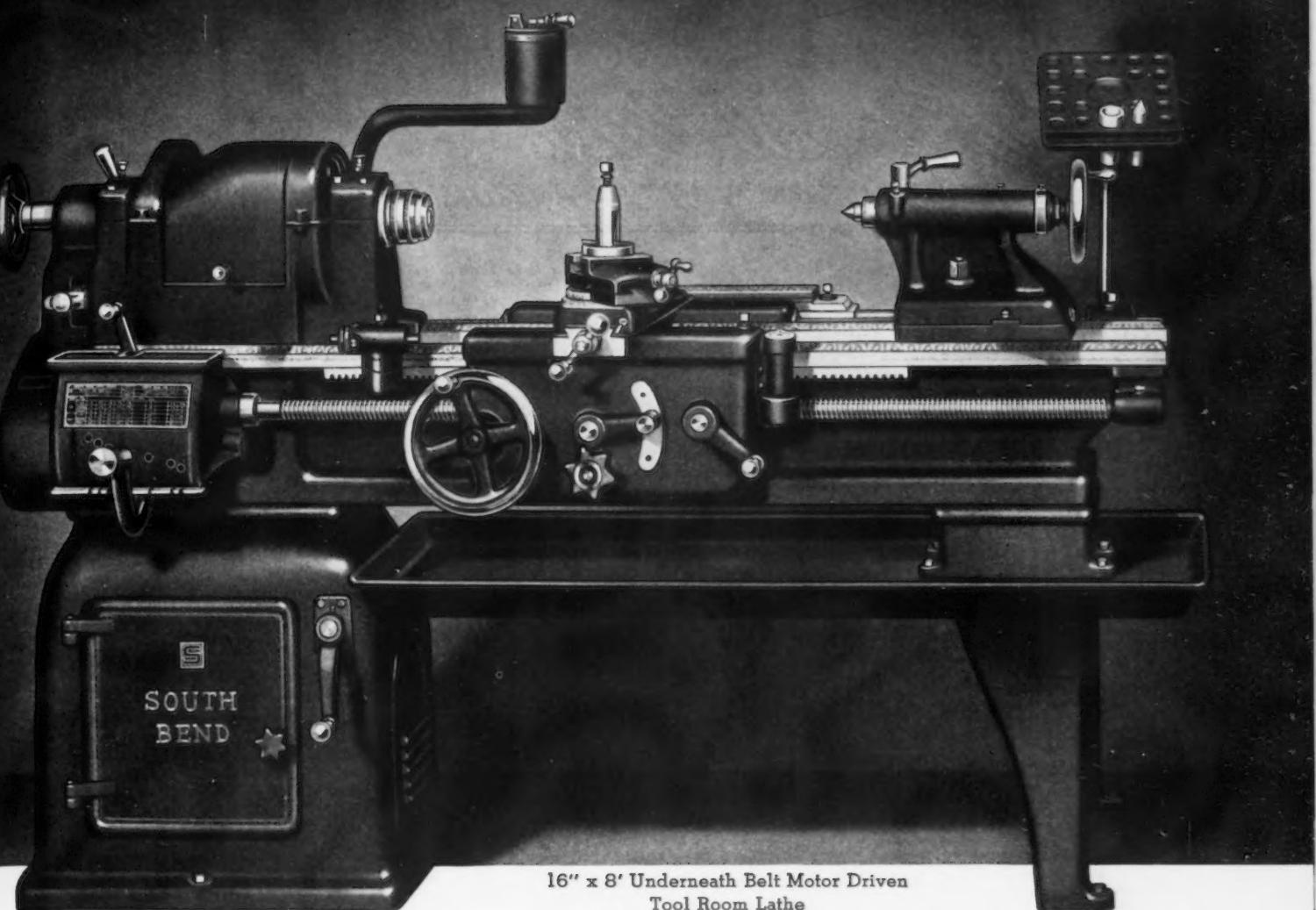
*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

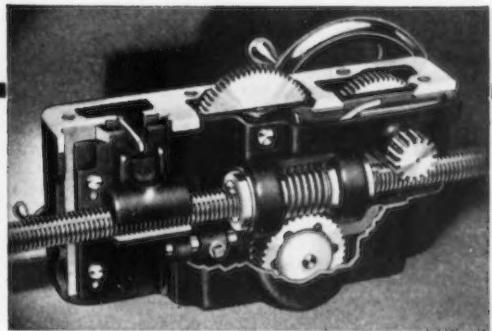
Pitts- burgh	Chi- cago	Cleve- land	Phi- ladel- phia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles	
Sheets, hot rolled	\$3.15	\$3.05	\$3.15	\$3.35	\$3.38	\$3.23	\$3.05	\$3.51	\$3.45	\$3.18	\$3.30	\$3.48	\$4.10
Sheets, cold rolled	4.10	4.05	4.05	4.40	4.30	4.30	4.58	.....	4.12	4.35	4.43	6.30	
Sheets, galvanized	4.75	4.60	4.42	4.50	4.30	4.64	4.00	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	.....	3.41	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	.....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, ed. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	.....	8.52	8.84	8.38	10.65
Bars, ed. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exclusions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.23.



16" x 8" Underneath Belt Motor Driven
Tool Room Lathe

SOUTH BEND LATHES FOR PRECISION WORK



Double Wall Apron

Back view of the Double Wall Apron showing the rigid, one-piece box type construction that provides a substantial support for both ends of the gear shafts.

Gears in the apron are of steel and have a reservoir and felt wick automatic oiling system. Worm drive assures smooth operation of feeds on all classes of work.

A powerful multiple disc friction clutch operates both the Automatic Cross Feeds and Automatic Longitudinal Feeds. A slight turn of the clutch knob instantly engages or disengages the clutch.

South Bend Lathes have been giving thousands of users dependable service on the most exacting classes of precision machine work for more than thirty years. Sound design, the most expert workmanship and the best materials available are combined in South Bend Lathes to give them permanent accuracy and efficiency.

SIZES AND TYPES

Manufactured in 9", 10", 13", 14½" and 16" swing, bed lengths 3' to 12', in Motor Drive and Countershaft Drive. Attachments are available for production, tool room and general machine work.

New South Bend Lathe Catalog

Write today for a copy of our new 112-page lathe catalog describing all Sizes and Types of South Bend Lathes, chucks, tools and attachments.

ON DISPLAY IN ALL PRINCIPAL CITIES

Popular sizes of South Bend Lathes are carried in stock for prompt delivery and demonstration by machinery dealers in 477 of the principal cities of the world. A few prominent distributors displaying South Bend Lathes are listed below. Write for name of the dealer nearest you.

Baltimore, Md. — Carey Machinery Co.	Newark, N. J. — J. R. Edwards Machinery Co.
Bridgeport, Conn. — A. C. Bisgood	New York, N. Y. — A. C. Colby Machinery Co.
Buffalo, N. Y. — R. C. Neal Company, Inc.	Philadelphia, Pa. — W. B. Rapp Machinery
Cleveland, Ohio — Reynolds Machinery Co.	Pittsburgh, Pa. — Tranter Manufacturing Co.
Dayton, Ohio — C. H. Gosiger Machinery Co.	Portland, Ore. — Portland Machinery Company
Detroit, Mich. — Lee Machinery Company	Providence, R. I. — Geo. T. Reynolds & Son
Houston, Tex. — Wessendorff, Neils & Company	Rochester, New York — Ogden R. Adams
Los Angeles, Cal. — Eccles & Davies Mach. Co.	San Francisco, Cal. — Moore Machinery Co.
Milwaukee, Wis. — W. A. Voell Machinery Co.	York, Pa. — York Machinery & Supply Company

SOUTH BEND LATHE WORKS

LATHE BUILDERS SINCE 1906

325 E. Madison St., South Bend, Ind., U.S.A.



Sales Possibilities

...CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

• **Aviation & Transport Corp.**, 420 Lexington Avenue, New York, has authorized expansion and improvements in parts and assembling departments in Lycoming Division plant, Williamsport, Pa., used for production of aircraft engines. Appropriation of \$1,500,000 has been approved for work. Company also will expend about \$300,000 for hub and propeller manufacturing departments.

Electro Metallurgical Co., 30 East Forty-second Street, New York, ferroalloys and metals, subsidiary of Union Carbide & Carbon Corp., has let general contract to Fiske-Carter Construction Co., Greenville, S. C., for one-story addition to branch plant at Muscle Shoals, Ala., 75 x 220 ft., for storage and distribution. Cost close to \$70,000 with mechanical-handling and other equipment.

Bureau of Yards and Docks, Navy Department, Washington, plans extensions and improvements in power plant at Naval station, Long Island, N. Y., including additional equipment. Cost about \$210,000. Also will replace present tank repair shop No. 405 with new unit, and replace present filling house No. 307. Cost about \$62,000. Appropriations have been authorized in amounts noted.

General Electric Co., Schenectady, N. Y., has plans for new branch plant at Jackson, Miss., with main one-story unit, 80 x 800 ft., and adjoining smaller structures. Cost about \$750,000 with equipment.

American Valve Co., 34-11 Forty-fifth Street, Long Island City, valves and other engineering specialties, plans new one-story plant on Thirty-second Street, near Thirty-eighth Avenue, 81 x 100 ft., for storage and distribution. Cost about \$40,000 with mechanical-handling and other equipment.

International Plastic Corp., 11 West Forty-second Street, New York, has leased one-story building, 102 x 162 ft., on Ridgedale Avenue, Morristown, N. J., and will improve for new plant. Company is a subsidiary of Plastic Binding Corp., 732 South Sherman Street, Chicago.

National Biscuit Co., 449 West Fourteenth Street, New York, has asked bids on general contract for one-story factory branch, storage and distributing plant, 100 x 200 ft., at Syracuse, N. Y. Cost over \$50,000 with equipment. Louis Wirsching is company architect.

F. & M. Schaefer Brewing Co., 2-16 South Ninth Street, Brooklyn, has filed plans for extensions and improvements in multi-story plant. Cost about \$350,000 with equipment. Eggers & Higgins, 542 Fifth Avenue, New York, are architects.

Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J., aviation instruments, is negotiating with City Commission, Newark, N. J., for lease of three-story center market, and will improve for new branch instrument works. Main offices are at South Bend, Ind.

Bakelite Corp., 247 Park Avenue, New York, plastic products, has asked bids on general contract for one-story addition to branch plant at Bound Brook, N. J. Cost over \$60,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., will purchase machine tools for arsenal use during fiscal year, for which appropriation has been authorized. Also will purchase, on bids to be asked soon, cast iron target practice shot for seacoast guns, sets of metal parts for artillery fuzes and bomb fuzes, projectiles for 60 and 81-mm. mortars, sets of metal parts for boosters, various steel adapters for artillery ammunition and other supplies.

Piper Aircraft Corp., Lock Haven, Pa., is awarding separate contracts for erection of three one-story additions, of which two, each

about 50 x 400 ft., are for expansion in assembling department, and other, 48 x 100 ft., for general service. Cost close to \$100,000 with equipment. Hunting, Davis & Dunnells, Century Building, Pittsburgh, are architects and engineers. W. T. Piper is president.

Metropolitan Edison Co., 412 Washington Street, Reading, Pa., has let contract to L. H. Focht & Son, Inc., Baer Building, for addition to steam-electric generating plant, 80 x 225 ft., and 90 ft. high, at West Reading. Cost over \$750,000 with equipment. E. M. Gilbert Engineering Corp., Reading, is consulting engineer.

Buffalo District

• **Curtiss Aeroplane & Motor Corp.**, Tonawanda, N. Y., airplanes and parts, has let general contract to Darin & Armstrong, Inc., 2041 Fenkell Avenue, Detroit, for three-story and basement addition, 60 x 105 ft. Cost close to \$100,000 with equipment.

Solvay Process Co., Solvay Station, Syracuse, N. Y., plans new steam-electric power plant at branch chemical and raw material plants at Baton Rouge, La. Cost over \$200,000 with equipment.

Harrison Radiator Corp., Lockport, N. Y., automobile radiators, has asked bids on general contract for one-story addition, with two-story section, 240 x 350 ft. Cost close to \$175,000 with equipment, instead of smaller sum previously noted.

New England

• **Monsanto Chemical Co.**, Springfield, Mass., industrial chemicals, etc., has let general contract to J. R. Roy & Sons Co., 21 Silver Street, for four-story and basement addition to plastic materials manufacturing plant at Indian Orchard, Mass. Cost over \$200,000 with equipment. J. R. Worcester & Co., 79 Milk Street, Boston, are consulting engineers. Main offices are at St. Louis.

Bureau of Yards and Docks, Navy Department, Washington, has engaged Scholfield & Deimel, New London, Conn., architects, to prepare plans for group of one-story shops and mechanical buildings at local submarine base. Cost over \$2,000,000 with equipment. Bureau has let general contract to Stone & Webster Engineering Corp., 49 Federal Street, Boston, for extensions and improvements in power plants at submarine base noted and Boston Navy Yard, to cost about \$1,325,000 with equipment.

United States Electrical Motors, Inc., 200 East Slauson Avenue, Los Angeles, has let general contract to C. W. Blakeslee & Sons, Inc., 58 Waverly Street, New Haven, Conn., for one-story branch plant at Milford, Conn., 200 x 220 ft., with power house adjoining. Cost close to \$100,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, is architect and engineer.

Henry Hutchinson, formerly supervisor of screw department of Eagle Lock Co., Terryville, and previously night supervisor of automatic screw machine department of New Departure Mfg. Co., Bristol, Conn., is setting up machinery in Bradstreet Building, Thomaston, Conn., to engage in metal fabrication, specializing particularly in field of duraluminum and chrome-nickel steels.

South Atlantic

• **Florida Pulp & Paper Co., Inc.**, Pensacola, Fla., organized several months ago with capital of \$3,000,000, has let general contract to Rust Engineering Co., Clark Building, Pittsburgh, for pulp and paper mill at Cantonment, near Pensacola, consisting of one and multi-story units for production of white wrapping,

writing and book stocks, with power station, pumping plant, machine shop and other mechanical structures. Cost over \$2,500,000 with equipment. Company also will develop timberland tracts in Escambia County for raw material supply, with sawmills and other structures, loading and mechanical-handling facilities. Hardy S. Ferguson & Co., 200 Fifth Avenue, New York, are consulting engineers. James H. Allen is president.

Aridye Corp., 300 Plaza Road South, Fairlawn, near Paterson, N. J., dyes and chemicals, has let general contract to Rock Hill Lumber Co., Rock Hill, S. C., for one-story branch plant at Rock Hill. Cost close to \$45,000 with equipment.

South Central

• **Alabama Power Co.**, Birmingham, has let contract to Skinner-Biederman Construction Co., Tuscaloosa, Ala., for additions and alterations to steam-electric generating plant at Chickasaw, Ala. Plant will be increased by capacity of 40,000-kw., with installation of turbine-generator unit of that rating, high-pressure boiler and auxiliary equipment, for which awards are being made separately. Cost about \$3,500,000.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Aug. 5 for towing winch and auxiliary equipment for Kentucky Lock.

Selma Baking Co., Selma, Ala., has let general contract to Faulk Lumber Co., Selma, for new one-story baking plant, with main unit 80 x 100 ft. Cost close to \$65,000 with traveling oven, mixing machines, conveyors and other mechanical equipment.

Washington District

• **Purchasing and Contracting Officer, Holabird Quartermaster Depot**, Baltimore, asks bids until Aug. 12 for tool brackets, axes, shovels and other equipment (Circular 398-15).

State Military Division, Baltimore, Major-General Milton A. Reckford, plans new steel hangar, 150 x 250 ft., with repair and reconditioning shops, at municipal airport on Broening Highway, for 29th Observation Squadron, Maryland National Guard, shop units to occupy one-story leanto extension, 35 x 250 ft. Cost about \$300,000. Financing is being arranged through Federal aid. Laurence P. Sangstron, 2109 Denison Street, is architect.

Bureau of Yards and Docks, Navy Department, Washington, has appropriation of about \$3,540,000 for expansion and improvements at Pearl Harbor, T. H., Navy Yard, including one-story pipe and copper shop, \$150,000 with equipment; one-story galvanizing shop, \$85,000 with equipment; storage and distributing building, about \$1,000,000 with equipment; one-story electric shop, \$465,000 with equipment; other mechanical shops, about \$1,400,000 with equipment. About \$400,000 will be used for purchase of cranes and other mechanical-handling equipment, and for auxiliary construction. An appropriation of \$2,300,000 has been made available for Naval Air Station at San Juan, P. R., including hangars, shops, oil and gasoline storage facilities, and other structures.

Frankfort Distilleries, Inc., Columbia Building, Louisville, has let general contract to Hays & Nicoulin, 939 Franklin Street, Louisville, for eight-story addition to branch plant at Race and Ostend Streets, Baltimore, for storage and distribution. Cost over \$125,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 6 for motor-generators and electrical equipment for variable pressure water tunnels at Car-

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derock, Md. (Schedule 2404); motor-driven self-feeding sliding-head drilling machine and drilling machine vise (Schedule 2422), escutcheon and taper cotter pins (Schedule 2400), nails, spikes, tacks, brads, etc. (Schedule 2396) for Eastern and Western yards; six revolving cylinder-type steam sirens and spare parts (Schedule 2397) for Norfolk, Va., San Diego and Mare Island Navy yards; until Aug. 9, magnet wire (Schedule 2448) for Brooklyn and Mare Island yards.

Southwest

• **American Car & Foundry Co.**, 2800 DeKalb Street, St. Louis, plans new one-story shop, about 100 x 1000 ft., on Dorcas Street. Cost close to \$400,000 with equipment. Portion of unit will be equipped as a paint shop, with spraying, conveying and other mechanical equipment.

Stearman Aircraft Co., Wichita, Kan., plans one-story branch plant at Coffeyville, Kan., for parts production and assembling. Cost over \$85,000 with equipment. Overend & Boucher, Brown Building, Wichita, are architects.

Laclede Packing Co., 1701 North Prairie Avenue, St. Louis, meat packer, has let general contract to Herklotz & Herchert Contracting Co., 2023 Pestalozzi Street, for two-story and basement addition for expansion in lard rendering department. Cost close to \$50,000 with equipment. Koerner Engineering Co., Syndicate Trust Building, is engineer.

City Council, Clay Center, Kan., has plans for expansion and improvements in municipal power plant, including additional equipment. Cost about \$150,000. Special election has been called Aug. 5 to vote bonds in that amount. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Sinclair Coal Co., 1012 Baltimore Street, Kansas City, Mo., has approved plans for one-story mechanical shop at coal-mining properties at Tiger, near Hume, Mo. Cost close to \$40,000 with equipment. R. J. Raney, 6437 Washington Street, Kansas City, is architect.

Richter's Bakery, Inc., 430 South Laredo Street, San Antonio, Tex., has low bid on general contract from Chamberlain & Strain, National Bank of Commerce Building, at \$130,857 for new one-story baking plant. Cost over \$200,000 with mechanical ovens, mixing machinery, conveyors, loaders and other equipment.

City Council, Mineola, Tex., plans extensions and improvements in municipal power plant, including equipment. Cost about \$247,000. Special election has been called Aug. 5 to vote bonds in that amount. Albert C. Moore & Co., Smith-Young Tower Building, San Antonio, Tex., are consulting engineers.

Ohio and Indiana

• **Apex Machine & Tool Co.**, 501 East Third Street, Dayton, Ohio, universal joints, socket wrenches and other tools, has asked bids on general contract for new one-story plant, about 23,000 sq. ft. of floor space, on South Patterson Boulevard. Cost over \$60,000 with equipment. Geyer & Neuffer, Ludlow Arcade Building, are architects.

Berger Mfg. Division, Republic Steel Corp., Canton, Ohio, sheet metal products, has let general contract to Melbourne Brothers Construction Co., 2101 Woodland Avenue, N. W., for three-story addition, about 75,000 sq. ft. floor space. Cost close to \$200,000 with equipment.

Electric Products Co., 1725 Clarkstone Road, Cleveland, plans one-story addition, 40 x 140 ft. Cost over \$65,000 with equipment. H. M. Morse Co., 1500 Superior Avenue, is architect.

Williams Aircraft Corp., Toledo, Ohio, recently organized by Col. Roger Williams, Toledo, and associates, to manufacture airplane parts and equipment, has let general contract to Harold A. Dodson, 432 West Manhattan Boulevard, for initial unit of new plant at Monroe Street and Talmadge Road. Cost over \$50,000 with equipment. Other structures will be erected later.

South Bend Iron & Metal Co., South Bend, Ind., plans rebuilding part of one-story sal-

vage plant recently destroyed by fire. Loss about \$50,000 with mechanical-handling, loading and other equipment.

Board of Trustees, Purdue University, West Lafayette, Ind., has let general contract to A. E. Kemmer, Lafayette, at \$145,680 for new one and three-story engineering building, 165 x 166 ft., exclusive of equipment, which will be purchased separately. Walter Scholer, 1114 State Street, is architect.

Western Pa. District

• **American Cotter Pin Co.**, Park Building, Pittsburgh, wire nails, cotter pins, etc., affiliated with American Steel Co., has let contract to Guibert Steel Co., 1617 Youghiogheny Avenue, for one-story addition to branch plant at Ellwood City, Pa. Cost close to \$45,000 with equipment.

United States Engineer Office, New Post-office Building, Pittsburgh, asks bids until Aug. 9 for five crest gates, each with dogging devices; bulkhead and spare parts for crest gates, all for Loyalhanna dam, near Saltsburg, Pa. (Circular 6).

Blaw-Knox Co., Inc., Farmers Bank Building, Pittsburgh, steel products, plans one-story addition to Pittsburgh Rolls Division plant, Forty-first and Willow Streets, and will carry out erection by company forces. Cost over \$50,000 with equipment.

Middle West

• **Illinois Meat Co.**, 3939 South Wallace Street, Chicago, meat packer, has asked bids on general contract for three-story and basement addition. Cost over \$80,000 with equipment. H. C. Christensen, 616 South Michigan Avenue, is consulting engineer.

Chicago Metal Hose Corp., 1815 South Third Avenue, Maywood, Ill., has let general contract to S. A. Awsumb, 5732 North Wayne Avenue, Chicago, for one-story addition, 125 x 130 ft. Cost over \$85,000 with equipment. Hallberg & Beersman, 221 North LaSalle Street, Chicago, are architects; Engineering Systems, Inc., last noted address, is engineer.

Sundstrand Machine Tool Co., 2531 Eleventh Street, Rockford, Ill., has asked bids on general contract for two-story and basement addition, 64 x 65 ft. Cost close to \$45,000 with equipment. Gilbert A. Johnson, Swedish-American Bank Building, is architect.

Rath Packing Co., Sycamore and Elm Streets, Waterloo, Iowa, meat packer, has let general contract to W. A. Klinger, Inc., Warnecke Block, Sioux City, Iowa, for four and five-story addition, 55 x 85 ft. Cost over \$100,000 with equipment. Henschien, Everds & Crombie, 59 East Van Buren Street, Chicago, are architects and engineers.

Wisconsin Electric Power Co., Milwaukee, has authorized expansion and improvements in steam-electric generating station at Port Washington, Wis., with installation of new 80,000-kw. turbine-generator and accessories, high-pressure boiler and auxiliary equipment, doubling present capacity. Cost about \$7,000,000. Frederick Luber is company architect and engineer.

Automatic Engineering Works, Inc., 3544 West Gladys Avenue, Chicago, screw machine products, has let general contract to M. Dubin & Son, 1312 South Harding Avenue, for one-story plant, 50 x 180 ft., at 1500-10 West Adams Street. Cost close to \$65,000 with equipment. Sidney C. Finck, 134 North LaSalle Street, is architect.

Falk Corp., Milwaukee, has awarded general contract to Klug & Smith Co., for a new building at its plant on West Canal Street, 80 x 200 ft., to cost \$50,000.

Michigan District

• **Michigan Tool Co.**, 7171 East McNichols Street, Detroit, gear-cutting tools, gear-finishing equipment, etc., has asked bids on general contract for two-story and basement addition, 100 x 200 ft. Cost close to \$100,000 with equipment. Henry M. Freier, Murphy Building, is architect.

Continental Motors Corp., Muskegon, Mich., gasoline and fuel oil-burning engines, parts,

etc., has let general contract to Muskegon Construction Co., Muskegon, for one-story addition for a testing shop. Cost over \$50,000 with equipment.

Detroit Gasket & Mfg. Co., 12640 Burt Road, Detroit, has let general contract to R. C. Schultze & Son, Inc., 169 Kenwood Street, Grosse Pointe, Detroit, for one-story addition, 100 x 730 ft., for production expansion, storage and distribution. Cost over \$100,000 with equipment. H. D. Ilgenfritz, 468 Prentiss Street, is architect.

Pacific Coast

• **Lockheed Aircraft Corp.**, Victory Place, Burbank, Cal., has let general contract to F. B. Aldous & Son, 8327 Wilshire Boulevard, Beverly Hills, Cal., for one-story addition, 120 x 150 ft., to be assembly building No. 141. Cost close to \$100,000 with equipment. John and Donald B. Parkinson, Title Insurance Building, Los Angeles, are architects.

Johnston Fruit Co., Quinientos Street, Santa Barbara, Cal., has approved plans for new one-story packing plant, 285 x 300 ft. Cost over \$100,000 with conveying, loading and other mechanical-handling equipment. W. W. Ache, 301 North Citrus Avenue, Los Angeles, is architect.

Western Gear Works, 417 Ninth Avenue South, Seattle, has let general contract to C. L. Fey, 1224 Fifth Avenue West, for one-story addition. Cost close to \$40,000 with equipment. Loveless & Fey, 711 Broadway North, are architects.

Constructing Quartermaster, McChord Field, Tacoma, Wash., asks bids until Aug. 8 for oil storage and distributing system at local field (Circular 6888-2).

Cannon Electric Development Co., 420 West Avenue 33, Los Angeles, electrical products, plans new one-story plant, 115 x 225 ft., at 3209 Humboldt Street. Cost close to \$90,000 with equipment. John M. Cooper, 523 Beverly Hills, is architect.

Menasco Mfg. Co., Burbank, Cal., airplane engines and parts, has let general contract to Buttress & McClellan, 1013 East Eighth Street, Los Angeles, for new one-story plant, 160 x 340 ft., on San Fernando Road, for part production and assembling. Cost close to \$100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 6 for four 60-ton hand-operated hydraulic jacks (Schedule 2421) for San Diego Naval Air Station; motor-driven turret lathe (Schedule 2423); until Aug. 9, six worm reduction gears (Schedule 2430) for Mare Island Navy Yard.

Canada

• **Canadian Motor Lamp Co.**, Seminole Street, Windsor, Ont., automobile headlights, etc., has let general contract to Allan Construction Co., Ltd., 44 Wyandotte Street East, for one-story addition, 40 x 450 ft. Cost over \$125,000 with equipment.

North American Cyanamid, Ltd., Royal Bank Building, Toronto, Canadian subsidiary of American Cyanamid Co., New York, will begin work at once on new plant near Niagara Falls, Ont., for production of high explosives for British Government, with machine and mechanical shops, power station and other structures. Cost reported at \$10,000,000. Erection will be carried out by Chemical Construction Corp., 30 Rockefeller Plaza, New York, subsidiary of last noted company.

Cockshutt Plow Co., Ltd., Brantford, Ont., has started construction on plant addition, 70 x 200 ft., to cost \$75,000 with equipment.

Dominion Engineering Works, Ltd., First Avenue, Lachine, Que., has received tenders for addition to erecting shop, to cost with equipment about \$80,000.

Outboard Marine & Mfg. Co. of Canada, Ltd., Monaghan Road, Peterboro, Ont., has plans for addition, 105 x 150 ft. John T. Hornsby, 332 George Street, is architect.

Alliance Paper Mills, Ltd., Rosetta Street, Georgetown, Ont., has awarded general contract to Dunker Construction Co., Ltd., 251 King Street West, Kitchener, Ont., for plant addition, 50 x 145 ft. Walker & Elliott, 47 Wellington Street East, Toronto, are architects.